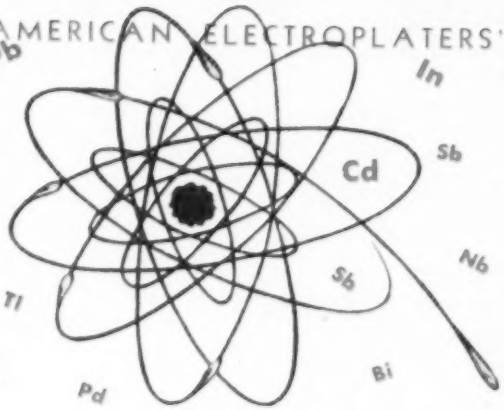
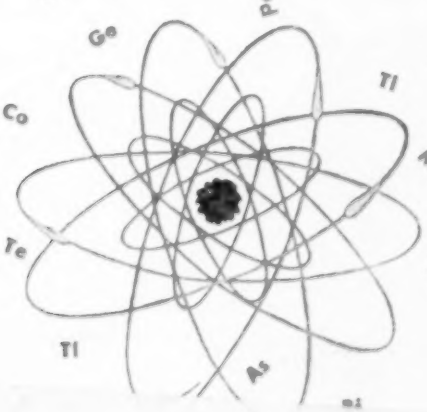
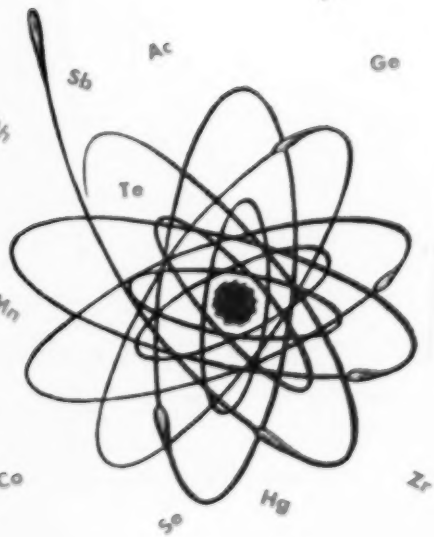
DECEMBER 1955

plating

JOURNAL OF THE AMERICAN ELECTROPLATERS' SOCIETY







University Microfilms
313 N. First St.
Ann Arbor, Michigan

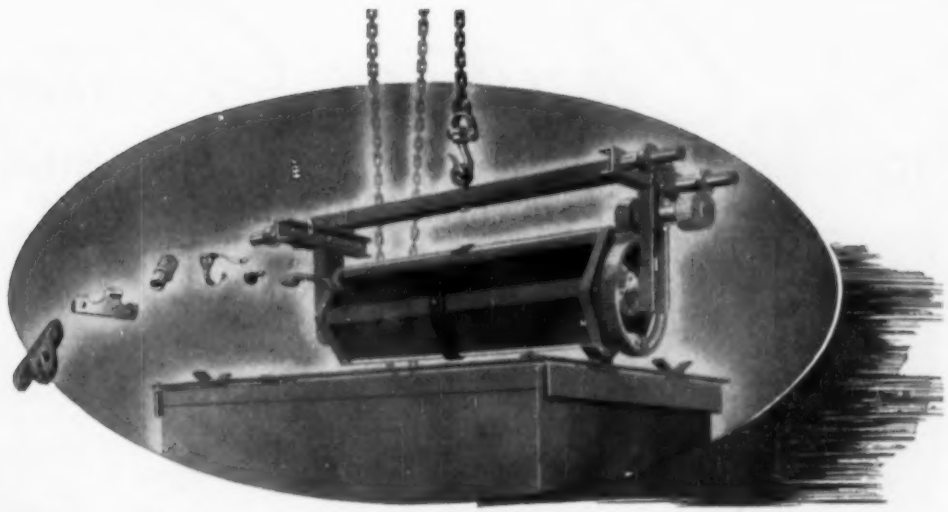
HOLIDAY GREETINGS AND THANKS TO OUR MANY FRIENDS

With our sincere wish for a
Happy Holiday Season goes
hearty thanks for making 1955
a boom year for CLEPO.
We pledge to merit the confidence
you have placed in us by serving
you during the coming year with
an even bigger and better line of

CLEPO PRODUCTS

FREDERICK **GUMM**
Chemical Company Inc.
538 FOREST STREET, KEARNY, N. J.

FOR FURTHER INFORMATION, USE READER SERVICE CARD; INDICATE A 1200.



Plating on Aluminum made EASY with Alumon

Hundreds of manufacturers throughout the United States are now using electroplated aluminum. The Alumon process is simple. The work is merely cleaned, dipped in acid, dipped in Alumon and is then ready for electroplating with copper, nickel, and other metals. The process is suitable for plating most wrought and cast alloys. . . The cost of using Alumon is low, being less than half a cent per square foot of surface area treated. The process can be fitted easily into regular plating cycles. Bulk or barrel plating readily done. Upon request we'll gladly send you the Alumon Process Bulletin.

Write for literature on Alumon and check list of literature on sixty Enthone products and processes for better metal finishing.

*TRADE-MARK REG. U. S. PAT. OFF. MANUFACTURED UNDER U. S. PATENT 2,142,564.

METAL FINISHING PROCESSES

ENTHONE INCORPORATED

ELECTROPLATING CHEMICALS

442 ELM STREET
NEW HAVEN, CONNECTICUT

Christmas Greetings

TO OUR FRIENDS IN THE METAL FINISHING INDUSTRY

from THE STEVENS TEAM

W. J. Cluff
Detroit, Mich.

A. B. Hoeter
Detroit, Mich.

F. Watt
Detroit, Mich.

G. A. Cummings
Detroit, Mich.

D. Swaninger
Detroit, Mich.

A. Kirkpatrick
Detroit, Mich.

J. Barton
Detroit, Mich.

J. D. Johnson
Detroit, Mich.

H. Moser
Detroit, Mich.

J. R. Heizmann
Detroit, Mich.

R. Amis
Detroit, Mich.

W. Thompson
Detroit, Mich.

L. V. Gagnon
Boston, Mass.

C. A. Mitchell
Springfield, Ohio

C. J. Menzemer
Buffalo, N. Y.

L. H. Tressler
Buffalo, N. Y.

H. Faint
Chicago, Ill.

G. D. Stevenson
Cleveland, Ohio

H. M. Brown
Dayton, Ohio

B. Jacoby
Dayton, Ohio

L. Singer
Detroit, Mich.

E. C. Elliott
Geneva, N. Y.

P. H. Norton
Grand Rapids, Mich.

R. J. Connelly
Hamilton, Ohio

R. Bender
Indianapolis, Ind.

R. Hoff
Jackson, Mich.

T. R. Williams
Mansfield, Ohio

R. J. Brown
Detroit, Mich.

H. M. Stevens
New Haven, Conn.

W. T. Lynch
New Haven, Conn.

K. Levensalor
New Haven, Conn.

E. King
New York, N. Y.

A. Ehrensberger
Philadelphia, Pa.

C. F. Stevens
Pittsburgh, Pa.

C. F. Smith
Detroit, Mich.

W. Rolak
Detroit, Mich.

FREDERIC B.
STEVENS
INCORPORATED
YOUR METAL FINISHING SUPERMARKET
DETROIT 16, MICHIGAN

An Educational Society for the Advancement of the Science of Electroplating, the Finishing of Metals and Allied Arts

plating

Journal of the American Electroplaters' Society

December 1955 **Vol. 42, No. 12**

P. Peter Kovatis

Executive Secretary and Managing Editor

Archimedes Doria

Editor

A. Brenner, J. B. Capuano, P. Coady, L. Diveley, F. Fulforth, R. Harr, A. Logozzo, H. McAleer, R. D. Miller, L. F. Scott, W. Tucker, H. Wiesner

Editorial Board

Richard E. Huntley

Production Manager

H. George Burnley

Advertising Manager

Robert F. Buehler

Assistant Advertising Manager

Lee F. O'Connell
111 N. LaCienega Blvd., Beverly Hills, Calif., CRestview 5-2022

William Ayres
Lee F. O'Connell Co.
233 Sansome St., San Francisco 4, Calif. YUkon 6-2981

Western Advertising Representatives

Published by the American Electroplaters' Society, Incorporated, 445 Broad Street, Newark 2, N. J. Phone: HUmboldt 2-3400. Yearly subscription for Members $2.00. Nonmembers U. S. and Canada $5.00, 65c a copy. Foreign, $8.00 a year, $1.00 a copy.

Copyright, 1955, by the American Electroplaters' Society, Incorporated.

PLATING is abstracted regularly in Chemical Abstracts, Metals Review, Metallurgical Abstracts, Engineering Index, Technical Data Digest, and Bulletin Analytique.

Statements of fact and of opinion given in articles and papers in PLATING are those of the contributors. The American Electroplaters' Society assumes no responsibility for them.

Articles appearing in this publication may not be reproduced in full or in part without express permission of the Managing Editor.

Published monthly at 5800 N. Marvine St., Philadelphia 41, Pa. Entered as second class matter July 1, 1946, at the Post Office at Philadelphia, Pa., under Act of August 24, 1916.

Editorial 1463

Purchasing Problems of a Manufacturer of Metal Finishing Equipment. *E. M. Close* 1519

Liquid Honing as a Surface Conditioning Operation. *E. Ehlert, G. Kauffman, G. Burrett* 1522

Scientific Paint Evaluation. *E. A. Zahn* 1525

Outlook for the Distribution of Nonferrous Metals. *Simon D. Strauss* 1531

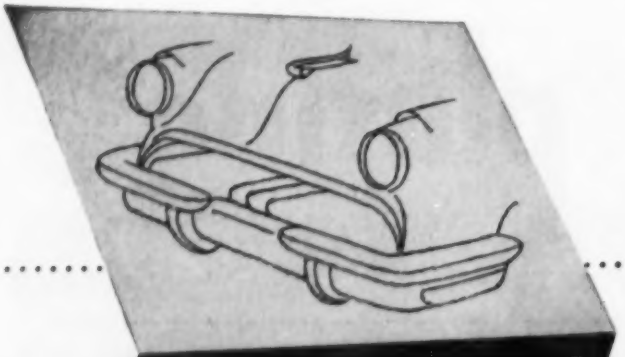
Job Plating, Shop Costs and Their Relationship to Pricing. *Arthur G. Pierdon* 1534

Diffused Nickel Cadmium as a Corrosion Preventive Plate for Jet Engine Parts. *R. W. Moeller and W. A. Snell* 1537

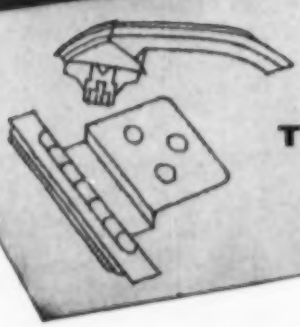
Study of Copper Anodes in Acid and Cyanide Plating Baths. *William H. Safranek and Dr. Charles L. Faust* 1541

Index to Plating Magazine, Vol. 42, 1955 1589

25 and 10 Years Ago 1556
AES Membership Report 1582
AES News 1562
Article References 1552
Books 1516
Branch News 1567
Classified Advertisements 1516
Cover Story 1502
Editorial 1463
Equipment and Supplies 1486
Future Meetings 1588
Industry News 1466
Industry News Briefs 1467
Intersociety News 1558
Mail Box 1562
Meet Mr. President 1566
Patent Abstracts 1548
Personals 1474
Trade Literature 1482
Washington-Baltimore Convention 1560
Index to Advertisers 1587



HARSHAW electroplating CHEMICALS and ANODES



nickel plating

. . . still and barrel . . . nickel anodes—all commercial grades and sizes . . anode bags . . . single nickel salts—nickel chloride . . . nickel carbonate . . . nickel fluoborate . . . boric acid.

chromium plating

. . pure "Krome Flake" 99.8% CrO_3 . . . sulphates less than .10% . . . lead, tin-lead and antimony-lead anodes.

copper plating

. . . copper ball anodes . . . Rochelle Salts . . . sodium and copper cyanides . . . copper sulfate . . . copper fluoborate.

cadmium plating

. . . ball and cast cadmium anodes . . . cadmium oxide . . . sodium cyanide . . . cadmium fluoborate.

tin plating

. . . cast tin anodes . . . sodium stannate . . . stannous sulfate . . . tin fluoborate . . . acid tin addition agent.

zinc plating

. . . ball and cast zinc anodes . . . sodium and zinc cyanide . . . zinc sulfate . . . zinc fluoborate.

lead plating

. . . cast lead anodes . . . lead fluoborate.

silver plating

. . . silver cyanide.

THE HARSHAW CHEMICAL COMPANY

Cleveland 6, Ohio

Chicago 10, Ill. • Cincinnati 13, Ohio • Detroit 28, Mich.
Houston 11, Texas • Los Angeles 22, Calif. • Philadelphia 48, Pa.
Pittsburgh 22, Pa. • New York 17, N. Y.

FOR FURTHER INFORMATION, USE READER SERVICE CARD; INDICATE A 1203.

Editorial

Free Exchange in A Free Society

The great advances in industry and the sciences surrounding industry have been directly traceable to the free exchange of information and knowledge in a free society. The progress of any individual engaged in an industry or a science results in a net gain for the whole industry or science.

The American Electroplaters' Society is, in effect, an instrument for the free exchange of information; for the sharing of common problems; for the development of common views which lead to solutions of common problems. Perhaps this is the reason why most platers who are invited to attend a meeting of the AES return again and again. There they find the opportunity to meet fellow platers from other companies and often from other cities. They go away richer than they came. And so, they return with pleasure.

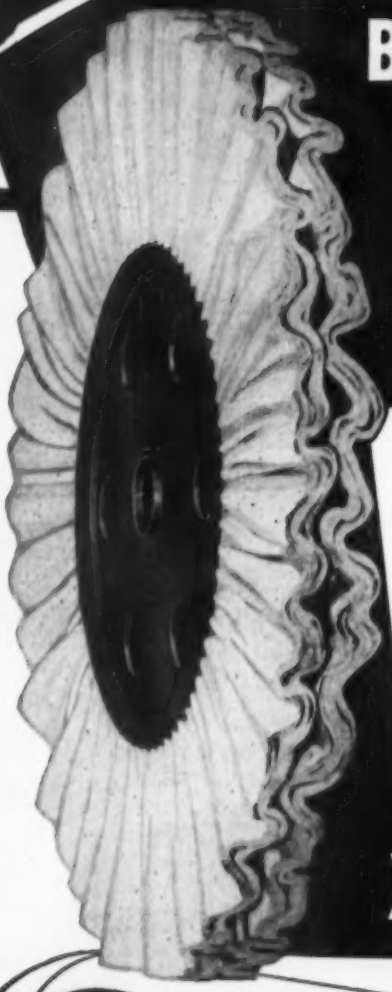
This quasi-fraternal characteristic pervades all the activities of the AES be they technical, practical or social. This period, in the midst of our major holiday season, would seem to be a most propitious time to remember the vast potential offered to platers and other metal finishers of the United States simply by belonging to the American Electroplaters' Society.

Herberth E. Head

Third Vice President, AES

New SCHAFFNER BIAS buffs

give more mileage...



because

...FULLY VENTILATED
...COOLER RUNNING
LOW COMPOUND CONSUMPTION
...FEWER SECTIONS NEEDED
...GIVES LONGER LIFE
...LATHE FACED AND BALANCED

Manufactured and controlled in our own new modern up-to-date Buff plant. Can be tailor made for your toughest buffing problem

MADE BY THE MANUFACTURERS OF FAMOUS AND ACCEPTED SCHAFFNER NO NUBBIN BUFFING COMPOSITIONS.

Schaffner
manufacturing company, inc.
SCHAFFNER CENTER • EMSWORTH, PITTSBURGH 2, PA.

CLIP TO YOUR LETTERHEAD

Phone ROsewood 1-9902

Please send me catalogue and complete information:

NOW PRESENTLY USING _____ Name, Manufacturer and _____
DIAMETER _____ Code No. of Buff _____
CENTER SIZE _____ CENTER SIZE _____
PLY _____ ARBOR _____
NORMALLY I USE _____ SECTIONS PER MONTH _____ COUNT _____
NAME _____ TITLE _____
COMPANY _____ STREET _____
CITY _____ ZONE _____ STATE _____

SCHAFFNER AIR-COOLED METAL-CENTER BUFFS ARE PRICED RIGHT • PRODUCED IN ALL DIAMETERS, CENTERS, PLYS AND COUNTS

FOR FURTHER INFORMATION, USE READER SERVICE CARD; INDICATE A 1204.

To the Rescue!

SEA OF BUFFING AND POLISHING PROBLEMS

If your business has those rush periods when everything seems to happen at once, SCHAFFNER Buffing and Polishing Compounds will prove to be a life-saver. SCHAFFNER Buffing and Polishing Compounds are tailor-made to your specifications and will never vary from order to order. Just fill in the coupon or call us collect today to obtain samples for job-testing in your own plant. We know that you will find SCHAFFNER Buffing and Polishing Compounds to be the answer to your production problems.

Clip To Your Letterhead

Schaffner
manufacturing company, inc.
SCHAFFNER CENTER, EMSWORTH, PITTSBURGH 2, PA.

Observed 1 - 9982

Schaffner
manufacturing company, inc.
SCHAFFNER CENTER, EMSWORTH, PITTSBURGH 2, PA.

I would like to have your free sample(s) of

_____

_____

NAME _____

TITLE _____

COMPANY _____

STREET _____

CITY _____ ZONE _____ STATE _____

FOR FURTHER INFORMATION, USE READER SERVICE CARD; INDICATE A 1206.

INDUSTRY NEWS

Shown above, front row, left to right, are three more Wyandotte Chemicals J. B. Ford Division sales representatives who have earned 25-year service watches: Harry A. Conroy, resident salesman in Kalamazoo, Mich.; Roy M. Barnes, resident salesman in Utica, N. Y., and Emil Haas, a N. Y. City district salesman. Congratulating the new watch wearers were back row, left, Fred Tholen, sales manager who received his 25-year watch last year and Ford Ballantyne, Jr., a Wyandotte Chemicals vice-president and general manager of the J. B. Ford Division

Wyandotte Chemicals Opens Service Laboratories—Enlarged technical service laboratories were recently opened by the J. B. Ford Division of Wyandotte Chemicals Corporation, both in Wyandotte, Mich., and in Los Nietos, Cal., near Los Angeles. These enlarged headquarters facilities enable the more than 200 Wyandotte Chemicals resident representatives to give faster "trouble-shooting" service.

Staff members of Wyandotte Chemicals J. B. Ford Division Technical Service Department regularly serve the following industries: Automotive, Aviation, Bottling-Brewing, Building Care, Canning, Dairy—Plant and Farm; Dishwashing, Fruit Peeling, Hospital, Hotel, Laundry, Meat Packing, Metal Cleaning, Plating, Poultry, Railroad, Restaurant, Rug Cleaning, and Textile.

Metallurgical Products Company Resumes Anode Production—Metallurgical Products Company, commercially dormant for the past six years, has resumed production as its president, I. W. Wilenchik, gets back into harness again.

At the time of his retirement on doctor's orders in 1949, Wilenchik had brought his company to a dominant position in the electrolytic metals field. It was, in fact, the largest manufacturer of chill-formed prime electrolytic anodes, shipping to customers throughout the United States and ten foreign countries. During those years Wilenchik had personally played a prominent part in the industry, developing new processes and alloys, and serving the government on various assignments as an expert on industrial metals.

The six year period of retirement was actually a transfer of activities for Wilenchik, enabling him to devote more time to research, and to continue experiments which had been started earlier, but which had been pushed aside by the pressure of business. One of the outstanding results of this research was lithium copper, the most powerful deoxidizer and degasser for high conductivity copper. He also developed a deoxidizer and degasser for aluminum bronze.

In 1954 he served on the Government Advisory Board to review metal specifications, allocations, and price regulations. During World War II and the Korean War he had served in Washington in a similar capacity.

He is a member of American Institute of Mining and Metallurgical Engineers, American Society of Metals, American Electroplaters' Society, American Society for Testing Materials, and the Franklin Institute.

F. H. Ross and Co. and Ruco, Inc. to Distribute Sel-Rex Products—The appointment of F. H. Ross and Co., Charlotte, N. C., as distributor of Sel-Rex selenium and germanium rectifiers and Double Duty Filters for liquid clarification or solids recovery, has been announced by Morris M. Messing, president of Bart-Messing Corporation, the manufacturer.

Established 35 years ago, F. H. Ross maintains 12 offices and warehouses from which 52 salesmen call on the metal finishing, industrial and chemical, and special equipment trade in North and South Carolina, Georgia, Alabama, Mississippi, Florida, Tennessee, and Louisiana.

Ed Redlhammer, Bart-Messing sales v. p., reports that special training sessions have already been scheduled so that F. H. Ross metal finishing sales and service engineers can discuss specific applications of Sel-Rex products with factory personnel.

Ed Redlhammer also announced that Ruco, Inc. of Dayton, Ohio, is acting as distributor for Sel-Rex filters for liquid clarification and solids recovery.

Ruco, Inc., originally appointed distributor for Sel-Rex selenium and germanium rectifiers early in 1953, is headed by Bob Ruleff, former Western Sales Manager for Bart-Messing Corporation, manufacturer of the Sel-Rex line.

The Ruco organization is active in Southern Ohio, Northern Kentucky, sections of West Virginia and South Eastern Indiana.

Applicator to Exhibit Protective Coatings at Chemical Show—The MW Protective Coatings Division of Metalweld, Inc., authorized applicator for many manufacturers of coatings and linings to combat corrosion and product contamination, will again be an exhibitor when the Chemical Show returns to Philadelphia's Convention Hall, December 5 to 9, 1955.

The MW exhibit, which formerly attracted many visitors interested in Synthetic Resin Coatings, Rubber Linings, Metallizing and Sprayed Metal Coatings, will again occupy Booth No. 240 and will feature the use of these materials for combating corrosion and product contamination in the food, petroleum, shipping, chemical, transportation and processing industries.

Time and Motion Study—More than 2000 production executives and methods engineers are expected to attend the 19th Annual Time and Motion Study and Management Clinic sponsored by the Industrial Management Society scheduled for November 9-10-11, 1955 at the Hotel Sherman, Chicago.

Thirty leading authorities from management, labor and industry will discuss the latest developments in the fields of time study, motion economy, job evaluation, production control, methods, plant layout, incentives, and human relations. In addition to the technical sessions, an industrial exhibit will be held featuring new products, processes, and services applicable to the industrial engineering field.

Feature of the event will be the Annual Methods Improvement Competition, with awards to companies and colleges for out-

INDUSTRY NEWS BRIEFS

● A library of noise will be one of the major results of a new sound analysis laboratory recently completed by the **General Electric Company** at Fort Wayne, Indiana. Recordings of the slightest murmur of electrical transformers and motors will make the "noise library" one of the most unique such collections in existence. The recordings will be used to compare various noises, so that noise sources can be isolated and corrected.

● Plans were announced for a multi-million dollar addition to the new **DuPont** plant now under construction near Antioch, Calif. It will manufacture sodium, ethyl chloride, trichlorethylene, and perchlorethylene.

● U.S. Buyers Welcomed to British Fair—More than 750 United States business men attended the last **British Industries Fair,** held in the spring of 1955. They formed the next to the largest overseas contingent in the total of more than 10,000 foreign visitors. For the next B.I.F. the British hope to attract overseas buyers in even greater numbers, and they are doing all they can to make their visit profitable.

● The **Carborundum Company** will spend 1½ million dollars to modernize and expand its "Monofrax" Refractories plant in Falconer, New York. The modernization and expansion program will be accomplished in progressive stages during the next 5 years and will be timed with the growing demand for "Monofrax" fused cast refractories manufactured in the Falconer plant.

● Plans have been adopted by the **Ohio River Valley Water Sanitation Commission** to secure measurements of radioactivity at selected points in the 981-mile length of the Ohio River and at the confluence of principal tributaries. The action was taken at the quarterly meeting of the eight-state pollution control agency on November 2. It represents a preparatory step to regular monitoring of the river in order that the Commission may be posted on changes in water quality resulting from the future disposal of radioactive wastes.

● The United States' first **National New Products, New Methods and Patents** exposition will be held in Detroit in the fall of 1956 under the combined sponsorship of civic, management and labor organizations in cooperation with private industry and state, municipal and federal government agencies.

● The position of Research Scientist has been created with the research organization of **Diamond Alkali Company.** *Dr. Alfred Hirsch* has been promoted to the post.

● **American Potash & Chemical Corporation** has announced substantial price reductions for the 1956 contract year on lithium hydroxide and lithium carbonate.

● Construction of a plant to provide the chemical—sodium hypophosphite—required in a new, non-electrolytic process for nickel plating of iron, steel, brass, bronze, and aluminum, has been announced by **Victor Chemical Works,** major producer of phosphorus, phosphates and other industrial chemicals. The new plant will be an addition to Victor's Nashville, Tennessee, facilities. The plant's product will contribute to lower processing costs and saving of nickel in the metal plating industry.

● **Ford Motor Company** has installed two new direct-reading spectrometers in its Dearborn Iron Foundry. These instruments, called "Spectrometa" and manufactured by **Baird Associates, Inc.,** Cambridge, Mass., permit speedy analysis of the cast iron to be used in making engine and other automotive parts.

BETTER WAYS TO BRASS PLATING

●

There are always more than one way of doing almost anything. Take the matter of brass plating. For almost any final finish there are several ways of obtaining it.

●

To obtain a bright brass finish there are several ways. A typical way which is widely used with good results is a brass flash (10 to 60 seconds) on a bright nickel plate. The nickel provides good build up of brightness and also is quite resistant to spotting out. More recently a brass flash on a bright bronze (copper-tin) has been used where nickel is unavailable. This has specific advantages on diecasting where the bronze may be applied directly to the diecasting.

●

Less widely used but very useful is a heavy brass plate which is bright dipped to produce high luster and smoothing. This method is especially useful for bulk work which cannot be burnished for any reason. For many parts which start with fairly bright surfaces with slight defects the best finish is obtained by brass plating and buffing. This is commonly done on such items as steel rods and frames. Diecastings may also be plated directly with brass and then buffed or satin finished. Brass will, however, diffuse into zinc so that an intermediate coating of copper is recommended if the parts are to be subjected to any heating for a considerable period of time.

●

Barrel burnishing is an excellent method for bulk parts and is widely used for barrel plated parts. Burnishing methods vary widely depending on finish necessary, type of parts and equipment available. The finish obtained by this method is excellent and the cost low. Brass which has been burnished is quite resistant to staining and spotting out.

●

All of these methods have advantages and disadvantages which should be compared before deciding how parts should be processed. The one thing is common is that all the methods require the best possible brass plating which is where True Brite Chemical Products Co. can help you. If you have a problem that you think brass plating can answer or if you would like information about possible methods to use in your production we will be glad to give you as much information as we can. Our line of products includes materials for brass plating of all colors and we believe we have more varied experience in brass plating than anyone else. There is no obligation in calling on our experience to help you. We'll be glad to hear from you.

TRUE BRITE CHEMICAL PRODUCTS CO.
BOX 31C OAKVILLE, CONN.

USE READER SERVICE CARD; INDICATE A 1206.

New!

TUBULAR FILTERS

by Industrial

WITH IMPORTANT NEW FEATURES DUE TO FLOW FROM INSIDE OF TUBE

- ★ **Unequaled simplicity of maintenance.**
- ★ **Solids can be recovered in dry form.**
- ★ **Liners are easy to replace and inexpensive.**
- ★ **Ideal for intermittent or continuous operation.**
- ★ **Chamber can be emptied without losing cake.**
- ★ **No unfiltered "heel".**
- ★ **Can be used with or without pre-coat.**
- ★ **Ideal for polishing . . . as a trap filter . . . and as a scavenger for larger filters.**

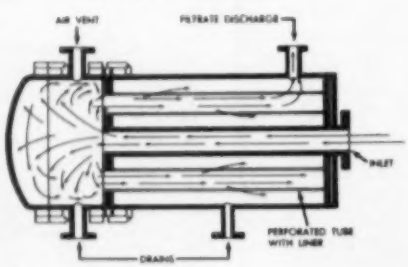
NEW SIMPLIFIED OPERATION

The filter is prepared for use by simply rolling flat sheets of filter paper and inserting them in the tubes, which are designed to force the paper snugly against the tube wall.

EASY TO CLEAN

Filter papers are simply withdrawn and replaced. Even the tubes are easy to remove, being held in place by a simple rubber O-Ring device. Except for the cover there are no nuts and bolts to handle.

FLOW DIAGRAM



FOR FULL DETAILS WRITE FOR BULLETIN TS-160-755.

CENTRIFUGAL PUMPS · PRESSURE FILTERS · ION AND HEAT EXCHANGERS · RUBBER LININGS · WASTE TREATING EQUIPMENT

Industrial

INDUSTRIAL FILTER & PUMP MFG. CO.

5906 OGDEN AVENUE • CHICAGO 50, ILLINOIS

INDUSTRY NEWS

standing advances in industrial engineering techniques and applications.

Rampe Appoints So. Cal. Rep—Rampe Manufacturing Company, Cleveland, O., have recently appointed Mido Products, Torrance, Calif., as Southern California representative. Rampe Mfg. Company manufacture a popularly priced line of small and medium sized tumbling units.

Dr. McGraw on Metal Hydrides—Formation of solid solutions or metal hydrides has been proposed by Dr. L. D. McGraw of Battelle Institute, Columbus, Ohio, as the mechanism of hydrogen entry into metals during pickling or plating. He discussed this hypothesis in a paper given at the annual fall meeting of the Electrochemical Society in Pittsburgh.

Dr. McGraw held solid solution or metal hydride formation to be a more likely mechanism of hydrogen entry than the adsorption of atomic hydrogen or the formation of molecular hydrogen in the metal. The entry mechanism proposed by McGraw does not require that entry occur at specific rifts or lattice defects in metals; entry may occur at any point.

Dr. McGraw noted that the rate of hydrogen accumulation in metals during plating or pickling processes depended on the combination of rates of entry, diffusion, and exit of hydrogen. These, he said, vary with conditions in the bath. If oxidizing agents are present, hydrogen exit is speeded and less embrittlement occurs. On the other hand, such impurities as chlorinated hydrocarbons and arsenic will reduce the exit rate, resulting in embrittlement.

Canadian Amalgamate—We have pleasure in announcing that William J. Michaud Co. Ltd., Montreal, and British Chrome & Chemicals (Canada) Limited, Toronto, have reached an agreement to amalgamate, effective October 1, 1955.

The two companies will continue to operate as separate identities with the head offices of both companies being located at Suite 905, 321 Bloor Street East, Toronto 5, Ontario.

The Montreal office of William J. Michaud Co. Ltd. is located at 4795 St. Catherine Street West, Westmount, Montreal 6, Quebec.

C. W. Michaud will continue to be the president of William J. Michaud Co., Ltd., and as heretofore will be located in Montreal. He will also be a director of British Chrome & Chemicals (Canada) Ltd.

M. R. Jennings will be managing director of both companies and will be located at the head office in Toronto.

First Design Engineering Show in Philadelphia in May—The first Design Engineering Show, a new departure in

"RELIANCE" PRODUCTS

EFFICIENT • EFFECTIVE • DEPENDABLE

At no charge, our Engineering Department is always glad to make recommendations and help solve your polishing and/or plating problems

RELIANCE SELENIUM RECTIFIERS

BENCH OR FLOOR MODELS

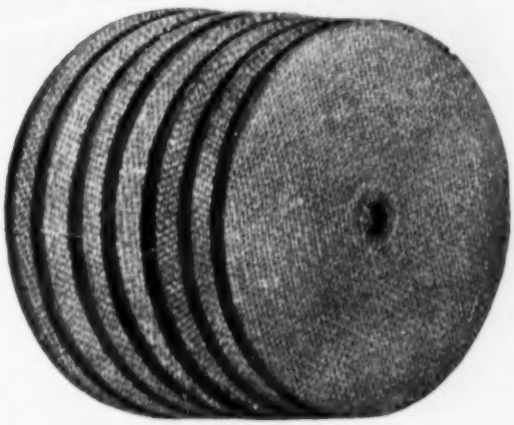
100 TO 5000 AMP OUTPUT

VOLTAGE RANGES
0- 6
0- 9
0-12
0-15
0-18
0-24

REMOTE CONTROL AT SMALL EXTRA COST

For that tough cutting down job on steel or stainless steel, solve your problem with

RELIANCE SISAL BUFFS



Specially treated:

For cooler operation—

For longer life by binding the fibres together to prevent fraying—

For better compound adherence—

To cut faster and bring up a high finish

RELIANCE matching compositions furnished in either molded cakes, or extruded to your specifications.

Chas. F. L'Hommedieu & Sons Co.

MANUFACTURERS of

Plating and Polishing Machinery

Complete Plating Plants Furnished

Chas. B. Little Co.
Newark, N. J.

W. R. Shields Co.
Detroit, Mich.

Gen. Office and Factory:
4521 Ogden Ave.
CHICAGO

Branches:
Cleveland
and
Los Angeles

FOR FURTHER INFORMATION, USE READER SERVICE CARD; INDICATE A 1208.

New efficiency in plating brighteners

Cadmium and zinc plating need not be dull and frosty. With Cadmax and Zimax, new brighteners distributed exclusively by Federated, cadmium and zinc plated parts are glossy and smooth.

These new Federated brighteners provide maximum throwing power, maximum coverage, maximum allowable current density, maximum brilliance and maximum luster. Zimax brighteners are available in both liquid and powder forms; Cadmax is available in liquid form only.

Ask your nearest Federated distributor to show you what Cadmax and Zimax will do. Or fill in the coupon below and we'll have a Federated sales engineer call on you from the nearest of our 13 plants and 23 sales offices.

Federated Metals

DIVISION OF AMERICAN SMELTING AND REFINING COMPANY
120 BROADWAY, NEW YORK 5, N. Y.
In Canada: Federated Metals Canada, Ltd., Toronto and Montreal

Aluminum, Magnesium, Babbitts, Brass, Bronze, Anodes, Zinc Dust, Die Casting Metals, Lead and Lead Products, Solders, Type Metals

Federated first in the non ferrous field FMD

I want to know more about Cadmax and Zimax, your new cadmium and zinc plating brighteners. Please have a salesman call on me.

Name.....Title.....

Company.....

Street.....

City.....Zone.....State.....

INDUSTRY NEWS

industrial expositions, will be held at Convention Hall, Philadelphia, May 14 to 17, 1956.

The show is the first to be devoted exclusively to the needs of those engineers who design products for consumer and industrial use.

The new show will have on exhibit all types of original equipment which go into the manufacture of a finished product. Exhibits will include parts, components, finishes and basic materials, as well as testing machines, X-ray machines and other equipment with specific design engineering applications.

Ray R. Simpson Honored at Annual Sales Conference—At its annual sales conference in Lac du Flambeau, Wis., September 30 to October 3, the Simpson Electric Company of Chicago honored its founder, Ray R. Simpson, on the occasion of his fifty years in the electrical instrument industry.

A special surprise meeting was included in the conference program during which Wallace E. Carroll, president, presented Simpson with an oil portrait of himself. The portrait was a gift from the company and its sales representatives. Gold pennants and banners carried out the golden anniversary theme in the meeting rooms, and a toast was drunk in "Goldvasser," a liqueur containing flakes of actual gold.

Dow Earns 1955 Chemical Engineering Award—Dow Corning Corporation, Midland, Michigan, pioneer and leading producer of silicones, was named winner of the 1955 Award for Chemi-

AES SUSTAINING MEMBERSHIP PROGRAM

Five more progressive firms have joined the AES Research effort through the important medium of the Sustaining Membership program. The new firms are:

Firm and City	Branch Credit
Arted Chrome Plating Co. Detroit, Michigan	Detroit
Higgins Rack Coating & Mfg. Co. Hazel Park, Michigan	Detroit
Sundmark Supply Co. Los Angeles, Calif.	Los Angeles
Time Chemical, Inc. Chicago, Illinois	Chicago
The Barber-Webb Co., Inc. Los Angeles, Calif.	Los Angeles
Number of Sustaining Members supporting AES Research through this month	318*
Number of Sustaining Members supporting AES Research through last month	315

*This represents a net gain.

Shown from left to right are, seated: Beatrice Rike, Secretary to Mr. Anderson; Vera Heins, Secretary to Wyandotte Chemical Product Control Center; Lee Minor, Field Service Representative; Donald E. Anderson, Director Technical Service, J. B. Ford Division; Gail Smith and Armin Roth, Field Service Representatives; Beverly Compeau and Rosalie Gjaimo. Standing: Al Weimer, resident representative in Chicago; Edward Kubia, Industrial Field Service Representative; Howard Anderson, Theodore Poloway, Jack Bowen, Leo Hawk, Tom Gilman and Victor Boka of the Wyandotte, Michigan Laboratories; Richard Booth and Fred Vassar, resident West Coast representatives

Said to be the deepest hard chromium plating tank in the United States, that of the Superchrome Engineering Co., Los Angeles, requires a converted oil derrick to hoist and lower long tubing and rods into position for plating

With a piece of a silicon crystal as a pointer, Paul J. Colleran, manager of General Electric's Rectifier Department Process Engineering Laboratory, explains a point in the development of silicon rectifiers to members of the Boston Branch of the AES

Paul J. Colleran explains a point to (l. to r.) Robert Mathews and Richard Murphy of the Watertown Arsenal; L. J. Love, M. E. Baker Co., Cambridge, and Frank George of the Watertown Arsenal

The group was guest of the G-E Department on the opening night of the Boston Branch's Fall season. After an informal dinner, welcome by M. I. Alimansky, general manager of the department and I. A. Lee, sales-manager, equipment rectifiers, the group went on a tour of the manufacturing facilities of the department. Following the tour, they heard G. B. Farnsworth, manager, industrial rectifier design, discuss the development and application of germanium rectifiers

cal Engineering Achievement. Announcement of Dow Corning's selection for the honor was made by Dr. Sidney D. Kirkpatrick, editorial director of Chemical Engineering, McGraw-Hill publication, which sponsors the award.

Dow Corning was selected to receive the award by an 84-man committee headed by Prof. Walter G. Whitman, director of the chemical engineering department of the Massachusetts Institute of Technology. All members of the Award selection committee are senior chemical engineering educators who head departments at colleges and universities accredited by the American Institute of Chemical Engineers and the Engineer's Council for Professional Development.

Since 1933 a dozen companies—or industrial groups—have received this biennial award for their successes in the development, design and operation of great plants and processes: Carbide and Carbon Chemicals Co. in 1953, for chemcals by coal hydrogenation; Philipps Petroleum Co. in 1951, for high-abrasion carbon black; and in 1943 and 1945, the American universities and industries most responsible for creating the synthetic rubber industry and the atomic bomb. But, according to Prof. Whitman, in selecting Dow Corning as winner of the 1955 Award, the committee for the first time honored a company primarily for the successful participation of its chemical engineers in the commercial development of new products, markets and sales.

Oil Derrick Hoists Work Into 45-ft Deep Chromium Tank—Superchrome, established in 1951, specializes in hard chromium applications on rod and tubing for the oil drilling industry, as well as in "difficult" plating jobs often thought impossible.

According to Superchrome, customers ship in work from as far away as Utah, Minnesota and Texas. The typical core and tube barrel job takes from 8 to 24 hours and costs $20 to $250, depending on size and type of item and thickness of deposit.

The deep tank, a recent addition to Superchrome's facilities, is set in a 43-foot pit and extends two feet above ground. It holds 2350 gallons of chromic acid solution. In the tank it is possible to hard chromium plate the inside diameter of core and oil barrel tubes up to 43 feet in length and with diameters up to six inches. Deposit thicknesses up to 0.008 to ±0.061 inch or better. Deposits up to 0.030 inch on the outside of this same length up to 2½ feet in diameter can be made.

In addition to long pieces such as oil field tubes, the deep tank is also used for plating calendar rolls (for rubber, paper, steel and other industries) in excess of eight tons in weight.

Full capacity for the tank is 120 core and tube barrels a month.

OBITUARY

EDWARD MAGNUSON

Edward Magnuson passed away in his sleep on October16, 1955. He is survived by his widow, Ingrid C. Magnuson; a daughter, Cecilia M. Roberg; a son, Pehr Edward Magnuson, and a granddaughter, Elizabeth Roberg.

Born in Kalmar, Sweden on July 4, 1878, Magnuson went to sea as a young boy. Among the ports of call was the United States and the young man soon made that his adopted land, becoming a citizen in 1913. He worked as a soap maker and devised various formulas which earned him a reputation in the industry. Magnuson was a pioneer in the detergent field and helped to build several of the leading companies in that field. In 1923 he organized his present firm, the Magnuson Products Corporation, and served as its president until his death; he also owned and headed Canadian Permag Products, Ltd. in Quebec.

Known for his many charitable interests, Magnuson was closely identified with The Swedish Hospital in Brooklyn of which he was President for ten years.

Magnuson was decorated twice by the late King Gustaf of Sweden as follows: Sweden-Delaware Tercentary medal of 1938 and "Chevalier of the Order of Vasa" on November 29, 1941.

Two officials of Sylvania Electric Products Inc. and their wives were killed in the United Air Lines crash near Laramie, Wyo., on October 6, 1955.

JOHN B. MERRILL

John B. Merrill, age 45, had overall responsibility for the Tungsten and Chemical, Atomic Energy, Electronics, and Parts divisions. He joined the Sylvania organization in 1941 in Towanda, Pa., as superintendent of the fluorescent powder operation, purchased at that time from the Patterson Screen Company. Upon completion of the new plant in Towanda in 1943, Merrill became plant manager, and in 1945 he was appointed general manager of the newly created Tungsten and Chemical Division. He subsequently was elected a vice-president. He was appointed a vice-president-Operations in 1953.

A native of Cumberland Center, Maine, Merrill was graduated from Bowdoin College in 1933 and obtained the degree of master of science in physics at Massachusetts Institute of Technology in 1936. For a time he was engaged at M.I.T. in special research work on crystals before joining Patterson Screen Company in 1936 as a research physicist. He was superintendent of Patterson's fluorescent powder plant when Sylvania purchased that operation.

He was a member of the American Physical Society; the Optical Society of America, the Electrochemical Society, and the American Association for the Advancement of Science. He also was a director of the First National Bank of Towanda and a trustee of the Robert Packer Hospital of Sayre, Pa.

Mrs. Merrill was the former Ann Tompkins of Towanda. She and Merrill are survived by two children, Peter Gray, three, and Martha Cutter, two. Merrill is survived by his mother, Mrs. Wallace L. Merrill, of Cumberland Center, Maine, and a brother, Paul Merrill, of Portland, Maine. Mrs. Merrill is survived by her parents, Mr. and Mrs. Theodore Tompklins, of Towanda.

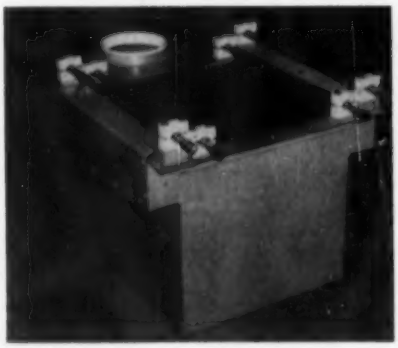
JAMES E. McGARR

James E. McGarr, age 45, joined Sylvania in 1943 from the General Electric Company where he had been a manager of production planning at the G-E River Works, Lynn, Mass. He served first as an accounting supervisor at Sylvania's Ipswich, Mass., plant, and several years later was assigned to the same position at Salem, Mass. In 1949 he was named manager of accounting at Salem. Later that year he became supervisor of area accounting.

In 1952 McGarr was appointed controller of the Tungsten and Chemical Division and in June, 1954, became division manager of operations. He subsequently was named assistant general manager, and was appointed general manager in September of this year.

Mrs. McGarr war the former Margaret Horgan of Danvers, Mass. She and McGarr are survived by four children.

Give your plating production a lift — specify STORTSWELDING for all your tank needs



Plating tanks for long runs or short runs need the extra service life that Stortswelded construction gives—sound, strong, full section, leakproof welds, linings of properly selected material, fittings accurately installed, casings designed and fabricated for low maintenance, adequate drainage, easy cleaning. Storts experience built into your tanks helps to keep your production moving. Make your tank problem our responsibility.

42 STONE STREET — STORTS WELDING COMPANY INCORPORATED — MERIDEN, CONN.

Manufacturers of Welded Fabrications to Specification

INDUSTRY NEWS

Industry Set to Greet '56 With a Grin

It's good humor time!

Starting next month (December) businessmen of every type—from the corner gas station operator to the multi-plant corporation—will begin distribution of their annual "good-will getters," the yearly calendar.

Nowadays, because calendar users want more than just dates on their calendars, this year's subject matter will range all over the lot, from household and beauty hints to full-color landscapes and the perennial animal and baby pictures. On the humorous side, the largest corporate chuckle will probably again be generated by one of the oldest industrial calendars, Bill Eddy's satirical creations for Minneapolis-Honeywell's Brown Instruments division.

This happy harbinger of the new year will again take humorous swipes at U. S. industry in 12 installments, following a format that has built up considerable readership in the past 15 years. Each year Captain William Crawford Eddy, U.S.N. (retired)—an electronics wizard and inventor in his own right—comes up with 12 original cartoons lampooning business and spoofing customers.

Coming in for some good-natured ribbing next year will be such topical subjects as automation, electronic "brains," research, incentive work and an industrial version of the "do-it-yourself" fad.

This year's calendar will be distributed to 55,000 U. S. businessmen and some 10,000 businessmen abroad in firms located in such countries as Great Britain, the Netherlands, Scotland, France, Belgium, Denmark, Germany, Sweden, Mexico and Switzerland.

Important Notice to Members and Subscribers

If you are going to move, it is necessary that the proper notification be made, at the earliest possible moment, so that you may continue to receive your copies of PLATING without interruption.

Such notification should be made to headquarters by letter, post card, or post-office form No. 22S, giving the old address as well as the new, with postal-zone number if any. You should also notify your local post office on postal form No. 22 of your change of address. Both postal forms are obtainable at any post office.

As considerable time is required to process a change of address, you are urged to advise the PLATING Circulation Department as soon as you know your new address, preferably three weeks in advance of moving.

PLATING
Circulation Department
445 Broad Street
Newark 2, N. J.

need a finish for protection—decoration—identification? specify IRIDITE®

Specify Iridite . . . for corrosion protection during storage or use . . . for a firm and lasting base for paint . . . for extra quality and eye-appeal . . . for low cost color coding of finished parts.

ON ZINC AND CADMIUM you can get highly corrosion resistant finishes to meet any military or civilian specifications and ranging in appearance from olive drab through sparkling bright and dyed colors.

ON COPPER . . . Iridite brightens copper, keeps it tarnish-free; also lets you drastically cut the cost of copper-chrome plating by reducing the need for buffing.

ON ALUMINUM Iridite gives you a choice of natural aluminum, a golden yellow or dye colored finishes. No special racks. No high temperatures. No long immersion. Process in bulk.

ON MAGNESIUM Iridite provides a highly protective film in deepening shades of brown. No boiling, elaborate cleaning or long immersions.

AND IRIDITE IS EASY TO APPLY. Goes on at room temperature by dip, brush or spray. No electrolysis. No special equipment. No exhausts. No specially trained operators. Single dip for basic coatings. Double dip for dye colors. The protective Iridite coating is not a superimposed film, cannot flake, chip or peel.

WANT TO KNOW MORE? We'll gladly treat samples or send you complete data. Write direct or call in your Iridite Field Engineer. He's listed under "Plating Supplies" in your classified telephone book.

Iridite is approved under government specifications

ALLIED RESEARCH PRODUCTS
INCORPORATED
4004-06 E. MONUMENT STREET • BALTIMORE 5, MD

Manufacturers of Iridite Finishes for Corrosion Protection and Paint Systems on Non-Ferrous Metals, ARP Plating Chemicals.
WEST COAST LICENSEE: L. H. Butcher Co.

FOR FURTHER INFORMATION, USE READER SERVICE CARD; INDICATE A 1211.

PERSONALS

House

Bignall

Corigliano

Donroe

Arthur G. Bignall has been elected president of Lasalco, Inc., St. Louis, replacing **Herman Struckhoff** who has resigned in order to establish his own metal finishing supply company on the west coast.

Bignall, formerly vice-president of Lasalco, joined the company in 1940 immediately after graduating from Purdue University where he obtained his B.S.M.E. degree.

Struckhoff will represent Lasalco in the western states on its complete line of electroplating equipment, as well as several other lines of finishing room equipment and supplies.

Norman K. House, formerly chief engineer of Lasalco, has been elected vice-president. **B. G. Daw,** formerly president of the company preceding Struckhoff, has been appointed a member of the board of directors.

Robert G. Parker has joined R. O. Hull & Company, Inc. of Cleveland, Ohio, in the position of technical service representative. He will work out of the New Haven, Conn., office of Enthone, Inc., which firm is the distributor for Rohco products in New England and eastern states.

Parker is well known around the Bridgeport area, having spent the past twelve years there as plating foreman at Casco Products Co. He attended the Bridgeport Engineering Institute and the University of Bridgeport. Currently, Parker holds the office of secretary, Bridgeport Branch, AES.

Appointment of **G. S. Corigliano** as advertising and sales-promotion manager of Bart-Messing Corporation, Belleville, N. J., manufacturers of equipment for the Metal Finishing Industry, has been announced by **Morris M. Messing,** president.

An alumnus of Columbia University, Corigliano has specialized in industrial Advertising and Production for the past decade in affiliations with manufacturers of Graphic Arts Machinery, Industrial Electrical Appliances and Food Processing Equipment in metropolitan New York and New Jersey.

In his new position, Corigliano will also initiate and direct advertising and promotion for Sel-Rex Precious Metals, Inc., developers of precious metals plating processes; Bart Manufacturing Corporation producers of anti-corrosive nickel plated steel sheets, pipes and fittings; and Bart Laboratories Co., Inc., pioneers in the electroforming process of manufacturing; all of which companies are under common owner-management.

Clay R. Brahm recently joined the sales staff of the Pennsylvania Salt Manufacturing Co.'s Metal Processing Chemicals Dept., sales manager **J. J. Duffy** has announced. He is a native of St. Louis and has been assigned to the company's St. Louis territory.

Brahm, a chemical engineer and a graduate of the University of Missouri, was associated with the Allied Chemical & Dye Corp. for the past 5 years. He will replace **Frank Wilcher** recently transferred to Louisville.

Parker

Walsh

Brahm

Smith

Gordon J. Berry, president, The Electric Products Company, Cleveland, Ohio, announces the appointment of **Harvey Bertrum Wilgus** as general sales manager. In his new position, Wilgus will be responsible for the sales activities in all divisions of the company.

He brings to his new position a wealth of selling experience. Wilgus was formerly general sales manager of Redmond Company, Inc., Owosso, Mich. Before joining Redmond in 1948, he had been with Barth Stamping & Machine Works, Inc., Cleveland, Ohio; Hercules Powder Co., Wilmington, Del.; and the Pennsylvania R. R., Philadelphia. With these companies, Wilgus served as machine designer, sales engineer, district sales manager and division sales manager.

Membership affiliations include: Society of Automotive Engineers, American Ordnance Association and National Sales Executives Club. He attended Temple University, Philadelphia, Pa., and Kent State University, Kent, Ohio.

L. E. Eckelmann, vice-president of Pyrene Metal Finishers, Inc. and Pyrene Manufacturing Company, announces the appointment of **Louis J. Donroe** as manager of Pyrene Metal Finishers, Inc. Donroe came with the Pyrene Manufacturing Company in 1929 and left in 1947 to join the Royal Plating & Polishing Company of this city.

Donroe has been closely identified with the metal finishing industry and was closely associated with the activities of the American Electroplaters' Society.

Walter J. Walsh has been appointed Ohio sales representative for the American Agile Corporation, Maple Heights (Cleveland), Ohio, according to an announcement by **Carl F. Freedman,** Agile executive vice-president and general manager.

Walsh, a graduate of John Carroll University, Cleveland, was formerly associated with Technical Brands, Inc., New York, as a sales representative for industrial plastics, principally polyethylene and vinyls. He resides at 20101 Priday Avenue, Euclid, Ohio.

The appointment of **Perry C. Smith** as manager of the Equipment Department of the Brush Electronics Company, Cleveland, Ohio, was announced by **C. B. Hoffman,** vice-president, sales.

Smith, who joined Brush earlier this year, was formerly general manager of Electronics Instruments Division of the Burroughs Corporation. Prior to that he was manager of Scientific Instruments Engineering for the Radio Corporation of America, Camden, N. J.

Polishing production "rockets" ahead with Behr-Manning abrasive belts

It's a cinch to bring up superior finishes in record breaking time with BEHR-MANNING abrasive belts. For example, the O.D. of the box end of a wrench (left) is polished in one pass on the belt. Though your operations may be different, chances are these smooth-cutting, versatile abrasive belts will cut man hours and increase output. Try them.

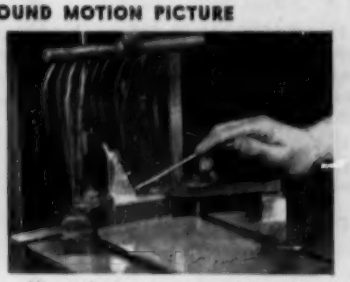
See this color movie . . .
"Coated Abrasive Belts Speed Metal-working Production". Contains 26 minutes of the latest coated abrasive methods, techniques and machinery. Address Behr-Manning, Troy, N. Y., Dept. P-12.

In Canada: Behr-Manning (Canada) Ltd., Brantford.
For Export: Norton Behr-Manning Overseas Inc., New Rochelle, N. Y., U. S. A.

A FEW SCENES FROM THE BEHR-MANNING COLOR AND SOUND MOTION PICTURE

Contour polishing fluted areas of bits on a 1/2" free-running abrasive belt.

Removing weld bead on tubing with a free-running abrasive belt.


Mirrors for boroscopes are being shaped on this wet abrasive belt grinder.

G-12

BEHR-MANNING® division of NORTON Company

▲ COATED ABRASIVES ▲ SHARPENING STONES ▲ PRESSURE SENSITIVE TAPES

FROM RAINCAP TO HOOD

Specify PLA-TANK® for your DUCT SYSTEM

Illustrated above is part of a new PLA-TANK Duct System which is typical of dozens being installed for fume exhausts in plating rooms, maintenance shops and chemical processing plants. PLA-TANK was chosen for the entire system from hoods to raincaps on the outside stacks.

Included in the system (in addition to hoods, ducts, stacks and caps) are molded PLA-TANK fan housings and propeller-type fan blades. *Everything that contacts the fumes is molded of chemical-resistant PLA-TANK.*

PLA-TANK, molded from long-life, resin-bonded glass fibre laminate is resistant to a wide variety of fumes and temperatures. It is lightweight, easy to install, competitively priced.

PLA-TANK can be the answer to your duct system problem. Let us help you the modern way — with PLA-TANK.

First in the field — and still the leader

Send for free data sheets

PLA-TANK, INC.

DIVISION OF

THE Chemical CORPORATION

Dept. 57 • West Warren, Massachusetts

PERSONALS

Hartwig

Yackley

Johns

Prziborowski

MacDermid Incorporated of Waterbury, Conn., recently announced the appointment of two additional sales representatives.

Robert J. Yackley, a 1950 chemical graduate of De Paul University, will work with **E. F. Stack,** Chicago manager, in the Northern Illinois, Wisconsin, Iowa, and Minnesota territories.

Frank C. Hartwig will be located in the Indiana territory with headquarters in Indianapolis. Hartwig had previous metal finishing experience in the hot-dip galvanizing and pickling department of U. S. Steel Corp., and most recently was employed by Promat Div. of Poor & Co. in the electroplating and research department and as a technical sales and service engineer. Frank is a member of the Indiana Branch AES and secretary for the Tri-State Region, AES.

Both men have completed their indoctrination course at the company's laboratory in Waterbury, Conn., and are located in their respective territories.

Appointment of **Silvio C. Taormina,** executive secretary, Masters' Electro-Plating Association, New York City, as technical advisor of the National Association of Metal Finishers has been announced by **John Palik, Jr.,** National Plating Corp., Cleveland, president of the Association.

Taormina is widely known throughout the industry as a consultant and writer on both technical and managerial aspects of metal finishing.

The General Ultrasonics Company of Hartford, Conn., takes pleasure in announcing the appointment of **Herbert A. Frankel** as engineering and sales representative in the New York and New Jersey area. Frankel, an M.I.T. trained metallurgist and management engineer, was formerly general manager of Foundry Services, Inc. He will cover the New York and New Jersey area for the application of this firm's ultrasonic processing equipment in the fields of electroplating, cleaning and descaling, pickling, textile dyeing and bleaching and for research and development purposes.

Stanley Johns was recently promoted to district sales manager of the J. B. Ford Division St. Louis office of Wyandotte Chemicals Corporation. **Fred Tholen,** sales manager of the Wyandotte, Mich., organization, announced the appointment.

Born in South Wales, Johns has attended both Detroit Institute of Technology and University of Michigan Extension Service. Before joining Wyandotte Chemicals Detroit sales staff in 1945, Johns had more than seven years of chemical and production experience with three nationally known manufacturers in the Detroit area.

George C. Prziborowski recently joined the industrial sales staff of Wyandotte Chemicals Corporation. He will headquarter in the company's San Francisco district office.

Prziborowski is a chemical graduate of San Francisco State College. He has served both the U. S. Navy and the Air Force and was recently Nuclear Research Officer, Special Weapons Command. He has been quality control chemist for a nationally known chemical products manufacturer and finishing department foreman for a steel products fabricator.

Titanium Metals Corporation of America announces further extensions of organization in sales service with the establishment of a Cleveland District Sales Office. **James C. Coffman** has been appointed manager of sales for the new Cleveland District.

Concurrently, **Donald B. Dik** has been selected to serve as manager of sales for the Eastern Sales District, out of headquarters at 233 Broadway in New York.

Coffman, whose office is now located in the Terminal Tower in Cleveland, Ohio, is a graduate of the University of Michigan. His degree is in Aeronautical Engineering. He formerly held several sales positions with TMCA. Dik is a Mechanical Engineer from Tufts University and was associated with the Tubular Products Division of Babcock and Wilcox Company before joining TMCA in 1954.

PERSONALS

Barrett

Ballantyne

International Rustproof Corporation announces the appointment of **L. D. Barrett** as director of research. Barrett was formerly chief chemist of Weatherhead Company. His Master's Degree was earned through studies at Case Institute of Technology and John Carroll University.

Ford Ballantyne, Jr., vice-president and general manager of The J. B. Ford Division of Wyandotte Chemicals, was recently elected to the board of directors. Ballantyne joined Wyandotte Chemicals production staff in 1941—was elected a vice-president in 1950 and became general manager of the Ford Division in 1953.

Ballantyne took an active part in planning and building the Ford Division's new Los Nietos plant—16 miles southeast of Los Angeles. He received his education from Williams College and Lehigh University. Before joining Wyandotte Chemicals he was employed by one of the country's leading banking institutions.

Bert Cremers, vice-president and general manager of the Michigan Alkali Division of Wyandotte Chemicals, was also elected to the Company's board of directors. Cremers is one of the best known sales executives in the Alkali industry.

Chester M. Brown has been named president of General Chemical Division, Allied Chemical & Dye Corporation. **Mark M. Biddison,** who has headed that Division since 1951, will continue his association with the Company functioning in an advisory capacity and handling special assignments.

Brown began his career with General Chemical Division as a production trainee at the East St. Louis, Ill., Works, in 1929. During the War, Brown was manager of the West Virginia Ordnance Works plant, which General Chemical operated for the government. Subsequently, he became sales and production head of the reagent and fine chemicals line, director of sales, vice-president, and in 1952 executive vice-president of the Division.

Brown was born in Cape Girardeau, Mo. He received his degree in chemistry from the University of Missouri.

MEAKER PLATING MACHINES

USED IN WORLD'S LARGEST PLATING PLANT

1200 AUTOMOBILE BUMPERS PLATED EVERY HOUR

The Meaker Company is proud of its contribution in designing and building the plating machines for this plant, put into production shortly after the beginning of the year. The large automobile manufacturer now plates all of the bumpers for its entire production in the one plant.

This is another example of Meaker's engineering and manufacturing ability which has been demonstrated so successfully over the past half century.

MEAKER

Engineered plating equipment is designed for highest efficiency in your particular operation. Call or write today and have a representative from our nationwide sales and service organization survey your problem with you at no obligation.

MEAKER PRODUCTS

THE MEAKER COMPANY

1633 SOUTH 55th AVE. • CHICAGO 50, ILL. • Phone OLympic 2-2110

• Full Automatic and Semi-Automatic Plating Machines • Strip Steel Plating Equipment
• Wire Galvanizing Equipment • Batch Type Plating Machines • Pickling Machines
• Processing Conveyors • Motor Generators for Plating • Rectifiers for Plating

This is not the familiar argument that white brass alloys are destined to replace nickel in the chrome process. It *is* a statement of fact about how leading platers have solved the problem of metal shortages and have saved money in so doing.

Promat Probrite is not a nickel substitute—it is a *superior* white brass alloy. It is electro-deposited to a thickness of .0002" to .00025", chrome plated, and sealed with a Promat chromate sealer to produce a protective surface with a luster comparable to that produced from a conventional bright chrome process. Probrite CR-723 is the buffable grade of the white alloy and when buffed will also have the depth of color found in the conventional decorative chrome process . . . with a cost advantage. Properly specified and properly used it will withstand standard salt spray requirements where specified for interior parts requiring high luster and long service life.

Many years of use, hundreds of hours of proven performance, and an impressive list of satisfied customers still haven't proven Probrite to be a miracle product, but they *have* proven that you can waste a lot of time and profit—*waiting* for a miracle.

PROMAT Division

Poor & Company

851 S. Market Street
Waukegan, Illinois

PERSONALS

Greenwood

Hillsley

Samuel H. Greenwood has been promoted to the position of field sales manager for F. J. Stokes Machine Company, Philadelphia, Pa., and **Fred Hillsley** has been appointed to succeed him as district manager of the Philadelphia territory, according to an announcement by **A. A. Hutchings, Jr.**, vice-president-in-charge-of-sales.

In his new position, Greenwood will direct all of Stokes' local sales activities in the United States and Canada, and will supervise the operations of the ten Stokes district offices, located in principal industrial centers from coast to coast.

Greenwood, a native of Cleveland, Ohio, received his B.S. in Mechanical Engineering from Case Institute of Technology in 1941. Following active duty with the U. S. Navy, he worked as a development engineer for the American Meter Company, Erie, Pa., before joining the Stokes organization in 1949. Serving first as manager of plastics extruder sales, he was named Philadelphia district manager late in 1953.

Fred Hillsley, born in Westchester County, N. Y., stood first in his class at Cornell University when he was graduated in 1941 with a B.S. in administration and mechanical engineering. After a brief period of service as an industrial engineer with Continental Mills, Philadelphia, he was called to active duty with the U. S. Army Ordnance Corps, from which he was discharged in December 1945 with the rank of major. He then returned to Continental Mills as plant engineer in charge of its power and maintenance department, remaining with this firm until recalled to military service in April, 1951.

He then spent fifteen months at Frankford Arsenal, first as industrial engineer and later as officer-in-charge of its artillery ammunition department, and subsequently spent eight months in Korea. Returning to civilian life in March, 1953, he joined Corning Glass Works as chief engineer of the company's plant at Central Falls, R. I. He joined the Stokes organization in September, 1953 as a sales engineer in the Philadelphia district office.

PERSONALS

Bartlett

Schumpelt

The appointment of **Kenneth M. Bartlett** as executive vice-president of Horizons Incorporated, Cleveland's industrial and governmental research organization, was announced by **Edwin T. Goodridge,** Horizon's president, at the company's executive offices in Princeton, N. J.

Bartlett, the former manager of research of Thompson Products, Inc., will supplement the management team of Goodridge and **Dr. Eugene Wainer,** vice-president and director of research, who have guided Horizons from its modest beginnings in 1946 to its present world acknowledged position in the fields of industrial research and development.

He has been a member of various NACA, Navy and Materials Advisory Board committees. Bartlett was the founder and the first president of the Investment Casting Institute, a trade association for the precision casting industry.

Dr. Karl Schumpelt has been appointed chief metallurgist for Sel-Rex Precious Metals, Inc., Belleville, N. J., announces **Edwin C. Rinker**, vice-president and technical director.

Well known is the precious metals field for his work with rhodium electroplating techniques, and for his contributions to electrochemistry of the platinum metals in general, Dr. Schumpelt held the position of chief electrochemist with Baker Co., Inc., for 23 years and with the Forstner Chain Corporation for 5 years.

Dr. Schumpelt is a graduate of the Berlin Institute of Technology, and the University of Berlin, where he received the degree of Ph.D.

Rinker reports that Dr. Schumpelt will devote most of his time to research and development at the Belleville plant of Sel-Rex where a fully equipped metallurgical laboratory has been set up for his use.

Three major personnel changes in the headquarters staff and an addition to the field sales staff of Chas. Pfizer & Co., Inc., Chemical Sales Division were announced. All changes were effective November 1.

H. Chandler Smith, eastern regional manager for the past three years, has been assigned to the division's headquarters staff as assistant to **Paul E. Weber,** assistant sales manager. Smith joined Pfizer in 1936 as a sales representative for the division covering the Philadelphia, Baltimore and West Virginia areas. From 1951 until 1953 he was field sales manager for the eastern region.

John E. McVeigh succeeds Smith as eastern regional manager. Upon joining the company in 1950, McVeigh served as a field sales representative, subsequently moving on to headquarters as administrative assistant to the division's general manager. He was named manager of the Food & Beverage Department in May 1953.

Succeeding McVeigh as manager, Food & Beverage Department, is **Jack D. Langlois,** who has held the position of assistant manager in the division's Medicinal Chemical Department since June 1952. A chemical engineering graduate of Rensselaer Polytechnic Institute, Langlois joined the company in 1949 as a field sales representative.

Robert D. Campbell joins the division's mid-western region as a sales representative. Campbell was graduated from Franklin & Marshall College in 1953.

Federated Metals Division, American Smelting and Refining Company, has promoted three men in a shift of key personnel.

George M. Baumann, assistant general manager of the Midwestern Department, has been transferred to New York as assistant to **Frederick Walker,** who is assistant to the president. **James F. McQuillan,** who had been manager of the Houston, Texas plant, has been named to Baumann's earlier position, while **M. Robert Berman,** formerly assistant to the manager of the Houston Plant, moves up to manager of the Houston Plant.

Born in New York City in 1914, Baumann was graduated from Columbia College and from the Columbia School of Mines, where he won a BS degree in Metallurgical Engineering. In 1938 he was

ATLANTIC GREASELESS COMPOUNDS *are unexcelled*

for fast, clean-working POLISHING & BUFFING OPERATIONS in the finishing of METALS, PLASTICS, & WOOD.

Economy-pak foil lined, fibreboard container

ATLANTIC GREASELESS COMPOUNDS are produced by specialists with a background of long experience in the compounding and application of greaseless finishing materials.

The rigidly controlled uniformity of ATLANTIC COMPOUNDS helps you maintain your high finishing standards. This dependable uniformity is assured by the highest grade ingredients and by extremely close quality control in manufacturing.

Devoted exclusively to producing unexcelled greaseless compounds, Atlantic maintains constant research striving for continually improved products. Technical assistance and data available upon request.

Aluminum Tube

THE ATLANTIC COMPOUND CO.
1860 BALDWIN STREET WATERBURY, CONNECTICUT

FOR FURTHER INFORMATION, USE READER SERVICE CARD; INDICATE A 1216.

Available for Immediate Shipment, Attractive Values

THE FOLLOWING EXCELLENT REBUILT AND GUARANTEED ELECTROPLATING MOTOR GENERATOR SETS AND RECTIFIERS, WITH FULL CONTROL EQUIPMENT:

PLATERS

1—7500/3750 AMPERE, 9/18 VOLT, **HANSON-VAN WINKLE-MUNNING,** Synchronous.
1—6000/3000 AMPERE, 6/12 VOLT, **CHANDEYSSON,** Synchronous, Exciter-in-head.
1—5000/2500 AMPERE, 6/12 VOLT, **CHANDEYSSON,** Synchronous, Exciter-in-head.
1—4000/2000 AMPERE, 6/12 VOLT, **CHANDEYSSON,** 25° C., Exciter-in-head.
1—3000/1500 AMPERE, 6/12 VOLT, **COLUMBIA,** Synchronous.
1—2500/1250 AMPERE, 9/18 VOLT, **ELECTRIC PRODUCTS,** Synchronous, Exciter-in-head.
1—2000/1000 AMPERE, 9/18 VOLT, **ELECTRIC PRODUCTS.**
1—1500/750 AMPERE, 6/12 VOLT, **HANSON-VAN WINKLE-MUNNING,** Synchronous, Exciter-in-head.
1—1500/750 AMPERE, 12/24 VOLT, **CHANDEYSSON,** Synchronous, Exciter-in-head.
1—1000/500 AMPERE, 6/12 VOLT, **ELECTRIC PRODUCTS.**

ANODIZERS

1—4000 AMPERE, 40 VOLT, **CHANDEYSSON,** Exciter-in-head.
1—1000 AMPERE, 40 VOLT, **CHANDEYSSON,** 25° C.
1—1000 AMPERE, 30 VOLT, **IDEAL,** Exciter-in-head.
1—750 AMPERE, 60 VOLT, **HANSON-VAN WINKLE-MUNNING,** Synchronous, Exciter-in-head.
1—500 AMPERE, 25 VOLT, **CHANDEYSSON,** Synchronous, Exciter-in-head.
1—400 AMPERE, 40 VOLT, **M.G.C.,** Exciter-in-head.

RECTIFIERS

1—2000/1000 AMPERE, 6/12 VOLT, **G. E.,** COPPER OXIDE, with Manual Control.
1—2000/1000 AMPERE, 6/12 VOLT, **G. E.,** brand new selenium stacks, with "On-load" Automatic Voltage Regulator.
1—**GREEN SELECTOPLATER,** 1800 AMPERE, 12 VOLT, 220/3/60.
2—**UDYLITE-MALLORY,** 1500/750 AMPERE, 6/12 VOLT, Control.

SPECIAL

1—20' x 4' x 3' H-VW-M Semi-Automatic for nickel.
1—H-VW-M Full-Automatic Plating Machine, 87' long, 39" lift, was used for copper and nickel.
1—H-VW-M Full-Automatic Plating Machine, 87' long, 39" lift, was used for chrome.
1—H-VW-M Full-Automatic Plating Machine, 40' long, 39" lift, was used for cleaning.
1—Production Pipe Polishing Machine, Model 101, Motorized.
2—**RONCI** Enamelers, No. R-100, and No. R-200.
1—K-4 SEMI-AUTOMATIC BUFFING MACHINE.
3—U. S. ELEC. TOOL, Mod. 110, TWIN 15HP POLISHING LATHES.
1—MODEL "A" PRESSURE BLAST.

Above is partial list only. Write to us for all your requirements for Plating, Anodizing and Metal Finishing

WIRE—PHONE—WRITE

M. E. BAKER CO.

25 WHEELER STREET

Kirkland 7-5460 CAMBRIDGE 38, MASS.

PERSONALS

employed as a chemist at Sand Springs, and in 1939 as assistant to the superintendent of roasters at Rosita, Mexico.

McQuillan's native city is Pittsburgh, Pa., where he was born in 1911. From 1929 to 1939 he attended Carnegie Institute of Technology Night School, specializing in Industrial Chemistry and Metallirgical Engineering. During most of this period he was employed at the Federated Metals Pittsburgh Plant as chemist and assistant chief metallurgist, and thereafter held positions at this Plant as chief metallurgist and plant superintendent.

A native of New York City, where he was born in 1920, Herman earned a BS degree in Chemical Engineering and an MS in Metallurgical Engineering at the University of Michigan, was commissioned in the Naval Reserve in 1941, and served until mid 1946.

In 1950, Herman was awarded a Fellowship by the Sloan Foundation for Executive Development, at the Massachusetts Institute of Technology.

F. P. Spruance, Sr., who has been a vice-president of the American Chemical Paint Company and sales manager of the Metalworking Chemicals Division for more than 30 years, resigned and is succeeded by **F. P. Spruance, Jr.** In his new capacity, F. P. Spruance, Jr., will direct the sales program of the Ambler, Pa., firm's Metalworking Chemicals Division.

Spruance, Jr., joined the American Chemical Paint Company in June 1944 as a research chemist in the coating and protection of metals and became assistant sales manager of the Metalworking Chemicals Division in May 1953.

Spruance, Sr., will continue as a director of the Company and, serving in a part time advisory and consulting capacity, make his years of experience in the metal industry available to his successors.

The appointment of **Charles F. Euler** as the Boston district manager for the Permacel Tape Corporation, New Brunswick, N. J., a Johnson & Johnson company, has been announced by **F. D. Clark,** consumer sales manager.

Euler joined Permacel Tape Corporation in 1947 after many years with the Glenn L. Martin Company. During his eight years association with Permacel, Euler has been a salesman in the Baltimore, Washington, Virginia area. He received his education at Baltimore City College and Johns-Hopkins University.

Promotion of three field sales engineers to key Industrial Division posts is announced by Minneapolis-Honeywell Regulator Company.

James W. Hughes has been named regional industrial sales manager for the company's midwest region with headquarters in Chicago. **Raymond A. Zack** will become industrial sales manager in the company's Hammond, Ind., branch office, and **Paul R. Sharadin** has been assigned to the new position of regional application engineer for the southwestern region with headquarters in Dallas, Texas.

Hughes, a graduate of Georgia Tech, joined Honeywell as an industrial sales engineer in Charlotte, S. C., in 1946 and was manager of the company's branch office in Birmingham, Ala., before his transfer to Chicago as branch industrial sales manager in 1954.

Zack joined Honeywell's Baltimore branch industrial sales staff in 1949 following his graduation from Lehigh University. He was transferred to Chicago as an industrial sales engineer in 1954 and was transferred to the firm's new Hammond office when it was opened January 1, 1955.

Sharadin joined Honeywell as an industrial controls service engineer in Dallas in 1951 and entered industrial sales work in the company's El Paso office the following year. He has been in charge of industrial sales in Odessa, Texas, since 1954. He is a graduate of Union College.

Donald V. Sarbach has been appointed to the newly created position of research director of Hewitt Robins, Inc., it was announced by **Thomas Robins, Jr.,** president. He will be a member of the company's executive staff in Stamford and will serve in an advisory and consulting capacity to technical and research departments at manufacturing plants in Buffalo, N. Y.; Passaic, N. J.; Fremont, Ohio, and Chicago.

Sarbach comes to Hewitt-Robins from the B. F. Goodrich Company, Akron, where he was technical manager for development of new industrial products, and before that was manager of the general chemical laboratories. During his 18 years at Goodrich he was awarded 30 patents on various rubber and chemical products and processes. Among his more recent achievements are the development of an air-porous vinyl coated fabric for upholstery and sportswear, a high-temperature insulating material for rockets and guided missiles, and a liner for the tubeless tire. He also has done extensive development work on synthetic rubber and plastics, including the new polyurethane plastic expected to become an important factor in the foam cushioning field.

A native of Lincoln, Neb., he was graduated from the University of Nebraska in 1934 with a Bachelor's degree in science and chemistry, following which he completed three years of post-graduate work in chemistry. He is a member of Phi Lambda Upsilon Society, a national honorary chemical fraternity, and Alpha Chi Sigma, national professional chemistry fraternity. He is a member of the American Chemical Society and the American Rocket Society.

Another Outstanding Achievement

by AMERICAN BUFF

Exclusive *NEW*

"Golden Treatment"

on

SISAL BUFFS

SPEEDS BUFFING...CUTS COSTS in all these ways!

STRENGTHENS SISAL FIBRES
to resist fraying and give longer wear

BINDS FIBRES TOGETHER
for firmer body, permits faster cutting ... fewer passes

HOLDS MORE COMPOUND
provides better buffing action with less waste

SISAL—the No. 1 buffing material—is now *better than ever* through our revolutionary new "golden treatment!" This amazing process *acts two ways* to improve the buffing quality of Sisal:

FIRST, it *overcomes* Sisal's resistance to oil and water, helps fibres hold buffing compound better.

SECOND, it gives the buff *firmer body*, without extra stiffness.

The result of four years of research, the new "Golden Treatment" is *your* golden opportunity for faster production, better work, and increased savings. *Ask for a demonstration in your own plant!*

Available on all American Sisal Buffs: Centerless . . . Permanent Center . . . or Conventional Type Sisal, as well as on Cotton Buffs.

"For the Job That's TOUGH, Use an AMERICAN BUFF"

AUTOMATIC BUFF CO. DIVISION OF

American Buff Company

2414 S. LaSalle St. • Chicago 16, Illinois • Telephone: CAlumet 5-1607

TRADE LITERATURE

The Right Tool for the Job

Rubber on Metal

Gears and Racks

Motors and Drives

L—1200. Illustrated Booklet—The Magnus Chemical Company, Inc., manufacturers of industrial cleaning equipment and materials, announces the availability of a new booklet entitled—"How to Select The Proper Method, Machine and Material."

This new manual with its 100 illustrations, showing various types of cleaning equipment, contains technical material which will help industrial plants in the selection of the method, material and machine best suited for their problems.

L—1201. Rubber Insulated Metal Parts Chart—ARco (Automotive Rubber Company, Inc.) recently issued a complete data chart on rubber insulated metal parts such as slips, clamps, and grommets. This literature also describes the rubber parts produced by the Form-Dipping process developed and pioneered by this company. The ARco Form-Dipping process is now utilized in producing rubber parts at a reported low cost in sample lots or production runs.

The chart contains detailed illustrations of ARco Form-Dipped parts in a broad variety showing diagrammed applications and complete descriptions. A full outline of the industries in which these parts serve is also given in this literature. For example, seals, boots, guards, and wiring harnesses for the automotive, aircraft, machine tool, farm equipment, and electrical industries are shown.

L—1202. Brochure on Gear and Rack Manufacturing Facilities—The Braun Gear Company of Brooklyn offers a colorful brochure detailing the various gear and rack manufacturing facilities it maintains.

Titled "A Visit With Braun," it shows an overall view of the plant, various machines in operation and lists the wide diversity of gears, racks, sprockets, spur gears, pinions, spiral and helical gears, worms and worm gears made by Braun Gear Company.

L—1203. New Bulletin on Motors—"Motors and Drives for the Machine Tool Industry," is the title of an informative and colorful brochure published by The Louis Allis Co., Milwaukee, Wis.

A pioneer in building motors for the machine tool industry, The Louis Allis Co. has drawn from its long experience in writing this valuable brochure. Included are photos and information on many of the firm's special and standard motors, and adjustable speed drives. Comprehensive descriptions and clear, large-sized photographs provide essential data on more than 15 motors and drives, plus more than 19 supporting illustrations on installations, and technical data on electrical features.

L—1204. Bulletin on Dry Process Tumbling Barrels—A new two-color bulletin, offered by Tumb-L-Matic, Inc., describes and illustrates LS Tumbling Barrels for large scale, low cost finishing operations. These single-tumbler barrels employ the dry process to cut down, deburr, and polish metal, plastic, hard rubber and wood parts.

The bulletin includes recommendations for selecting specific abrasive compounds to use in various tumbling operations. Detailed information on barrel sizes, drives, controls, liners and optional equipment is presented.

Photographs illustrate two models of the tumbling barrels and explain overhead gear motor drives. A table of specifications gives standard model numbers, tumbler sizes and number of compartments per barrel.

L—1205. Chemical Industry's Marts Indexed—"Chemical Market Abstracts," a monthly literature research service covering news and statistics for the chemical industry, has announced the publication of its first Annual Index, covering the year 1954. The volume contains more than 22,000 separate entries, classified under six major subject headings.

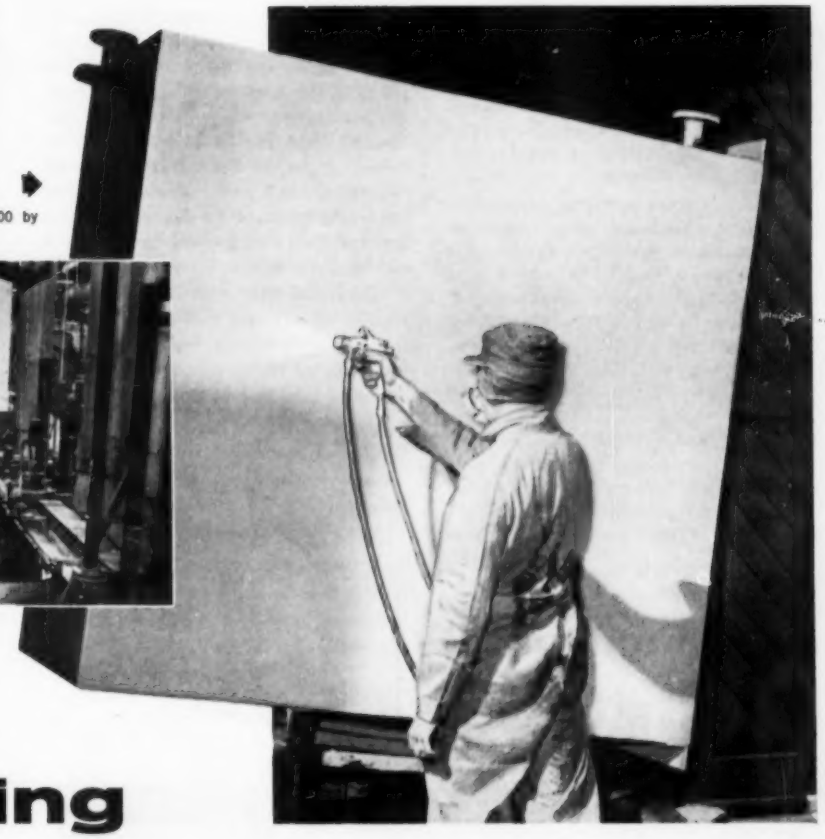
Listings under the Companies heading total about 11,000 and refer to approximately 5,000 companies and organizations, both domestic and foreign.

The Foreign section covers 182 different countries and geographical areas. About one-fifth of the more than 6,000 entries refer to Canada and the United Kingdom. West Germany has 350 entries, and Russia has 58.

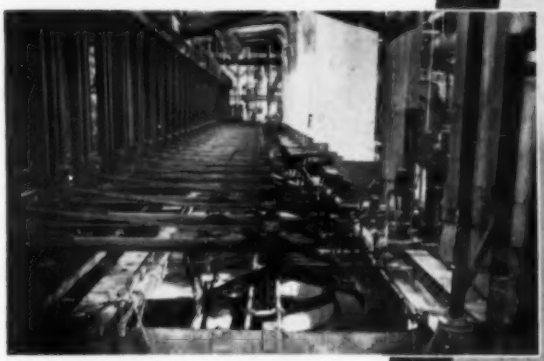
Material in the Trade-Mark section refers to about 2,500 chemical products newly developed or marketed during the year. Listings of new Uses of Chemicals total about 2,000, Unit-Consumption Factors over 200, and Patents over 150.

L—1206. Barrel Finishing Compounds—Four classes of precision barrel finishing compounds are described in a new set of four-page illustrated brochures prepared by Newton Industries Inc., West Haven, Connecticut. The compounds described are for a wide range of barrel finishing operations, from heavy deburring and cutting, to regular deburring, burnishing, and cleaning. In addition, rinsing and neutralizing compounds for between-stages operations are described.

Useful guide tables for correct finishing of metals, plastics, castings and parts are included for each compound and fully describe types of parts, amount of compound, type of media, amount of water, and finishing time. In addition, free consultation service on all finishing operations is offered.



Tank being sprayed with Coating 5300 by Kaybar, Inc., Hazel Park, Michigan.



Coating 5300 was specified for this line of tanks in big automotive plating plant.

spraying

with Unichrome Coating 5300

gives sheet-like coatings

Extraordinary, heavy duty plastisol protects against chemicals and corrosion

You can now take better advantage of the remarkable protection in plastisols. You can *spray*-apply what amounts to a *sheet* material.

In one coat, thermoplastic Unichrome Coating 5300 builds a pore-free film up to 20 mils thick . . . 5 to 20 times the thickness of an ordinary coating. Multiple coats can therefore do many of the jobs for which plastic and rubber sheet materials are generally used. Moreover, you get a superior job. There are no seams or joints with Coating 5300.

Coating 5300 also helps cut costs. One automotive plant coated a whole line of electrocleaning and rinse tanks, outside and inside, for less than the cost to do just interiors with plastic sheets.

This plastisol applies easily to tanks, ducts, drainboards and other equipment. It cures at 350° to 365° F. Coating 5300 won't chip and has high insulation value and exceptional toughness. It withstands all plating and cleaning solutions.

Nearby firms specializing in applying Coating 5300 can do it for you reasonably. It will also pay you to specify Coating 5300 on any *new* equipment you buy. Send for more information.

UNICHROME Trade Mark **COATINGS FOR METALS**

UNITED CHROMIUM DIVISION
METAL & THERMIT CORPORATION

100 East 42nd Street, New York 17, N. Y.
Detroit 20, Mich. • Waterbury 20, Conn.
East Chicago, Ind. • El Segundo, Calif.
In Canada: United Chromium Limited, Toronto 1, Ont.

FOR FURTHER INFORMATION, USE READER SERVICE CARD; INDICATE A 1219.

TRADE LITERATURE

L—1262. Control Panels—To illustrate the advantages of cubicle instrumentation, The Permutit Company, N. Y., has prepared a colorful 8-page bulletin No. 4178, Panels by Permutit.

Of interest to engineers dealing in water-conditioning problems or in utilization of ion exchange equipment, this bulletin shows typical assemblies of conventional and graphic type cubicles and a number of installations in various industries and for applications which include power stations, metal recovery, municipalities, demineralization, electroplating, sugar-refining, etc.

L—1207. New Literature on Sel-Rex Filters, Germanium Rectifiers and Double-Duty Filters—Six new catalog sheets on the complete line of Sel-Rex double duty filters for liquid clarification or solids recovery. Illustrate and describe standard portable, mobile and stationary units from 250 to 18,000 gph capacities. These units incorporate special design features, which permit thorough cleaning in 15 minutes or less. Also illustrated are the new Sel-Rex filter elements —stainless steel mesh annular and leaf type elements, and a disposable paper cartridge—depending on the specific model and application.

Standard models of Sel-Rex germanium rectifiers, from 500 to 50,000 amp capacity, in either forced air or completely sealed water cooled design, are illustrated and described in a new four-page folder.

Available with static magnetic amplifier control for automatic regulated output, Sel-Rex germanium rectifiers are said to have operating efficiency up to 95 per cent, which results in great savings in operating costs when compared to all other types of d-c power conversion equipment.

Another advantage claimed for the new Sel-Rex germanium rectifiers is appreciable savings in size and weight—more power in far less space.

A fully illustrated, four-page booklet describing the Sel-Rex double duty filters for use in electroplating, chemical processing, pharmaceuticals, food and beverages, paints and varnishes, petroleum processing, etc. has been prepared by the Bart-Messing Corp., Belleville, N. J.

The booklet describes the new filtration principle, utilized by the Sel-Rex double duty filters, which provides double filtration area and volume.

Illustrated and described also are the Sel-Rex filter element which is secured to the tank cover and lifts out for easy cleaning; a special hand operated davit to facilitate removal of the filter element on larger units; and the special design features which enable anyone to operate a Sel-Rex double duty filter immediately.

L—1208. Thermocouple Connectors—Minneapolis-Honeywell Regulator Co. published Specification Sheet 56 which describes Army-Navy (AN) Thermocouple Connectors. These provide a quick and easily detachable connection for one or more thermocouple circuits. They consist of mating plug and receptacle assemblies, keyed to prevent incorrect assemblies. Their particular usefulness is in test assemblies and for panelboards which are set up for semi-permanent use.

L—1209. Describes Barnstead Distilled Water Heater—Barnstead Still & Sterilizer Company's Bulletin no. 132 gives complete information on its Distilled Water Heater which heats distilled water automatically. The adjustable thermostat keeps the distilled water at any desired temperature. As with Barnstead Water Stills construction is of copper, lined with pure block tin to prevent metallic contamination.

The bulletin describes construction details of the Distilled Water Heater and also electrical requirements.

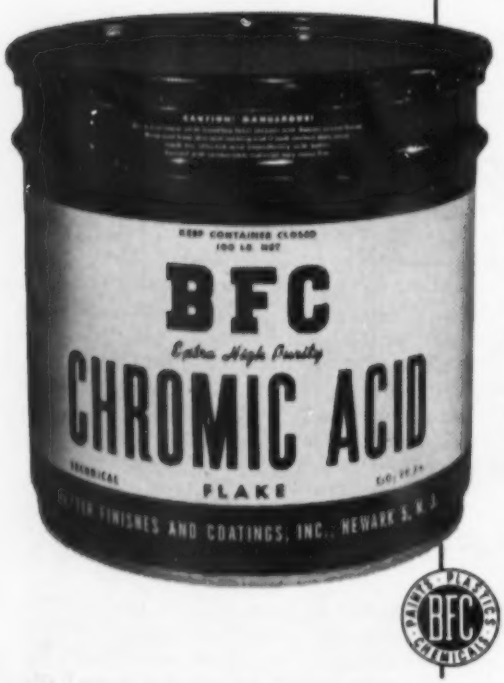
L—1210. Battery-Operated pH Meter—Self-contained, compact, light but sturdy in design, Model 125 is suited not only for laboratory use but also for plant and field use. A frame is available to carry the instrument, together with beakers, wash bottle and bottle for buffer, everything that is required for immediate on-the-spot pH tests. Concise step-by-step instructions are engraved on the front panel. Battery life is 2000 hours or a year of service even at full-time daily use.

extra high quality

CrO_3

Every batch checked!

99.75% pure



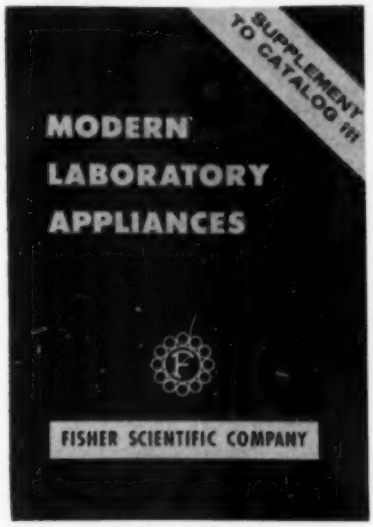
It's a fact. We check the purity of *every batch* of BFC Chromic Acid by our own special test in a plant lab located only a hop-skip-and-a-jump away from the flakers. Not a drum moves from plant to warehouse until the lab says, "OK".

We don't know any better way than 100% check-testing to keep our quality up . . . and complaints down. Do you?

BETTER FINISHES & COATINGS, INC.

268 Doremus Avenue, Newark 5, N. J.

2014 East 15th Street, Los Angeles 21, Calif.



Added since 1952

L—1211. Supplement to Fisher Catalog Features Condensation for Faster Reference—On the theory that time is as precious as plutonium to chemists (metallurgists, pathologists, biologists, physicists, too), the new Fisher Catalog Supplement describes, in just over 100 pages, all of the instruments, apparatus, glassware, laboratory furniture and accessories added to Fisher stocks since 1952 publication of the major Fisher Catalog.

The Catalog itself was quite a feat of condensation, with its projected 1,500 pages of material published in a streamlined 986-page edition, containing, according to Fisher editors, the largest assortment of scientific tools available today.

All items in the new Supplement (which can be inserted right inside the front cover of the Catalog) were selected and tested by the Fisher technical staff. There are dozens of new instruments, especially in the electrochemical, petroleum and clinical fields, newly developed and manufactured by Fisher.

L—1212. 'dag' Colloidal Dispersions for Metalworking Applications—How 'dag' dispersions of colloidal graphite and molybdenum disulfide can cut costs in a variety of metalworking operations is described in Bulletin No. 426, published by Acheson Colloids Company, Port Huron, Michigan.

'dag' colloidal graphite is especially effective in forging, wire drawing, extrusion, piercing, punching, deep-drawing, stretch-forming, spinning, cutting, machine lubrication, and press fitting, because of its excellent lubrication qualities and high resistance to heat. Bulletin No. 426 details methods of application, and the contribution of such products as 'Aquadag,' 'Glydag,' 'Oildag,' and 'Prodag' to metalworking operations, and gives the diluent ratios required in each instance.

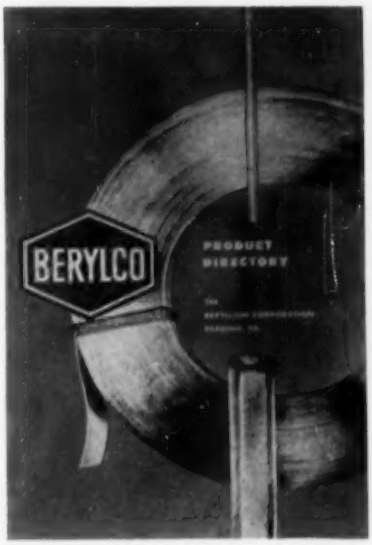
Also discussed is the selection of proper carriers so that, once application has been made, the liquid evaporates to leave a "slick" graphite film—at room temperature if necessary. The resulting dry lubricating film eliminates smoke, fire, and industrial skin-disease hazards.

L—1213. Thermo-Panel Coil Data and Price Bulletin—The Thermo-Panel Division of Dean Products, Inc., Brooklyn, N. Y., announces the availability of a 4-page bulletin which gives both design and price information.

Thermo-Panel is not a coil in the usual sense. It takes the place of pipe coils for industrial heating and cooling processes. Two metal plates are embossed and then welded together to form flow channels as shown in numerous illustrations.

An important advantage possessed by Thermo-Panel Plate Coils is that they can be made of a wide variety of metals. Thus if you should want to heat a given liquid that dissolves iron, copper, or brass, but does not affect Carpenter 20, you can then specify a Thermo-Panel Plate Coil of Carpenter 20 at a cost that you can estimate yourself by reading page 3 of the bulletin.

Page 3 also covers length and width variations; handles and hanger brackets; surface treatment; zinc metallizing; edge sealing weld; to make a closed cylinder; and half-couplings or pipe nipples. Page 4 contains 8 illustrations and gives further design information for replacing pipe coils.



Revised edition of Berylco Product Directory brings up to date the complete line of alloys and products offered by the Beryllium Corporation, Reading, Pa. New extrusion items include rod and bar stock, seamless beryllium-copper tubing in redraw sizes and extruded shapes, now available in commercial quantities, are described

Du-Lite
FINISHED

The Marlin Firearms Co., "Famous for Fine Guns since 1870", has long depended on Du-Lite black oxide for an attractive finish that will be dimensionally stable throughout the life of the gun.

The Du-Lite process provides intricate precision parts with a durable, rust-resistant black oxide finish. And since Du-Lite penetrates the metal, all crevices and knurls are protected without affecting dimensions or fit.

If your target is durable, attractive, economical finishing, you'll want to know more about Du-Lite black oxide.

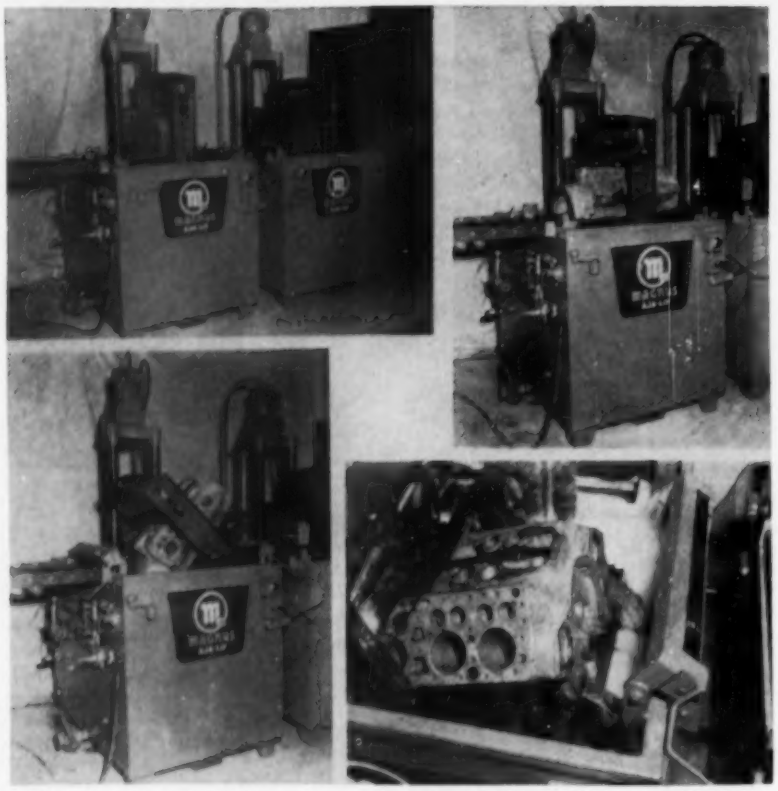
Whatever your cleaning or finishing problem—**Depend on Du-Lite.**

Write for complete information.

DU-LITE CHEMICAL CORP.
MIDDLETOWN, CONN.
Send more information on Du-Lite..... ☐
Send information on metal finishing products.. ☐
Have your representative call..... ☐
Name.....
Company.....
Address.....
City..... Zone..... State.....

Du-Lite
METAL FINISHING SPECIALISTS

EQUIPMENT & SUPPLIES



Upper Left—a production line setup of two Magnus Aja-Lif cleaning machines for cleaning and rinsing. Upper Right—An engine block positioned in the Aja-Lif and secured with adjustable hold down device. Lower Left—A view of the engine block as it is lowered into the cleaning solution. Rotation of the block has started. Lower Right—An action shot of the Aja-Lif in operation showing the cleaning solution pouring out of interior recesses of the engine block, insuring thorough cleaning

E—1215. Cleaning Machine—Magnus Chemical Company, Inc., announce a new Magnus Aja-Lif Cleaning Machine with "gyro-vertical motion" equipped with a work carrying platform combining rotary motion with vertical up and down agitation. At the same time as the work is moved up and down 120 vertical mpm, it is slowly rotated through a complete 360° circle. Oils, loose chips, casting sand and similar industrial soils are quickly and easily removed from intricate castings such as journal boxes, motor blocks, etc. Already it has replaced expensive manual scrapping and rodding at a leading manufacturing plant.

E—1217. Linemaster "Clipper" Foot Switch—For the first time, a precision snap-action foot switch is offered in three types of contact in three models of the "Clipper", available from Linemaster Switch Corp., Woodstock, Conn.

The "Clipper" now gives a real answer to the important feature of maintained contact—and still further, a practical impulse contact in a precision snap-action switch. It also is available in the popular momentary contact model that has proved itself in the field since its introduction two years ago.

In the momentary contact model, action is started by pressing, stopped by releasing. In the maintained contact model, action is both started and stopped by pressing. This is a particularly long lasting switch for medium heavy duty

Snap Action Pedal Switch

applications. Moulded nylon actuating cams provide longer life, need no lubricating.

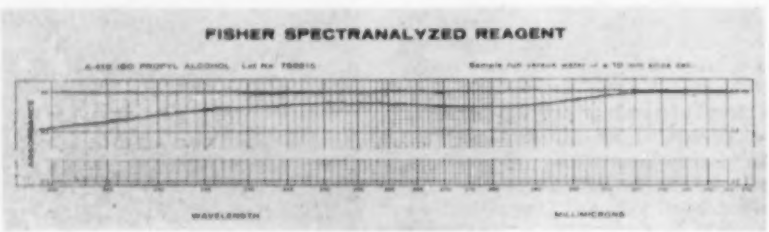
The impulse contact switch operates by pressing and release, with a fraction of a second contact. No contact on the release.

These rugged, compact switches can be easily operated from a sitting position, as well as a standing position. Nearly 100 per cent dustproof, yet very accessible to wiring—just two screws to remove to get at the inner mechanism.

E—1216. Ultra-Pure Reagents—A line of ultra-pure chemicals has been developed by Fisher Chemical Manufacturing Division.

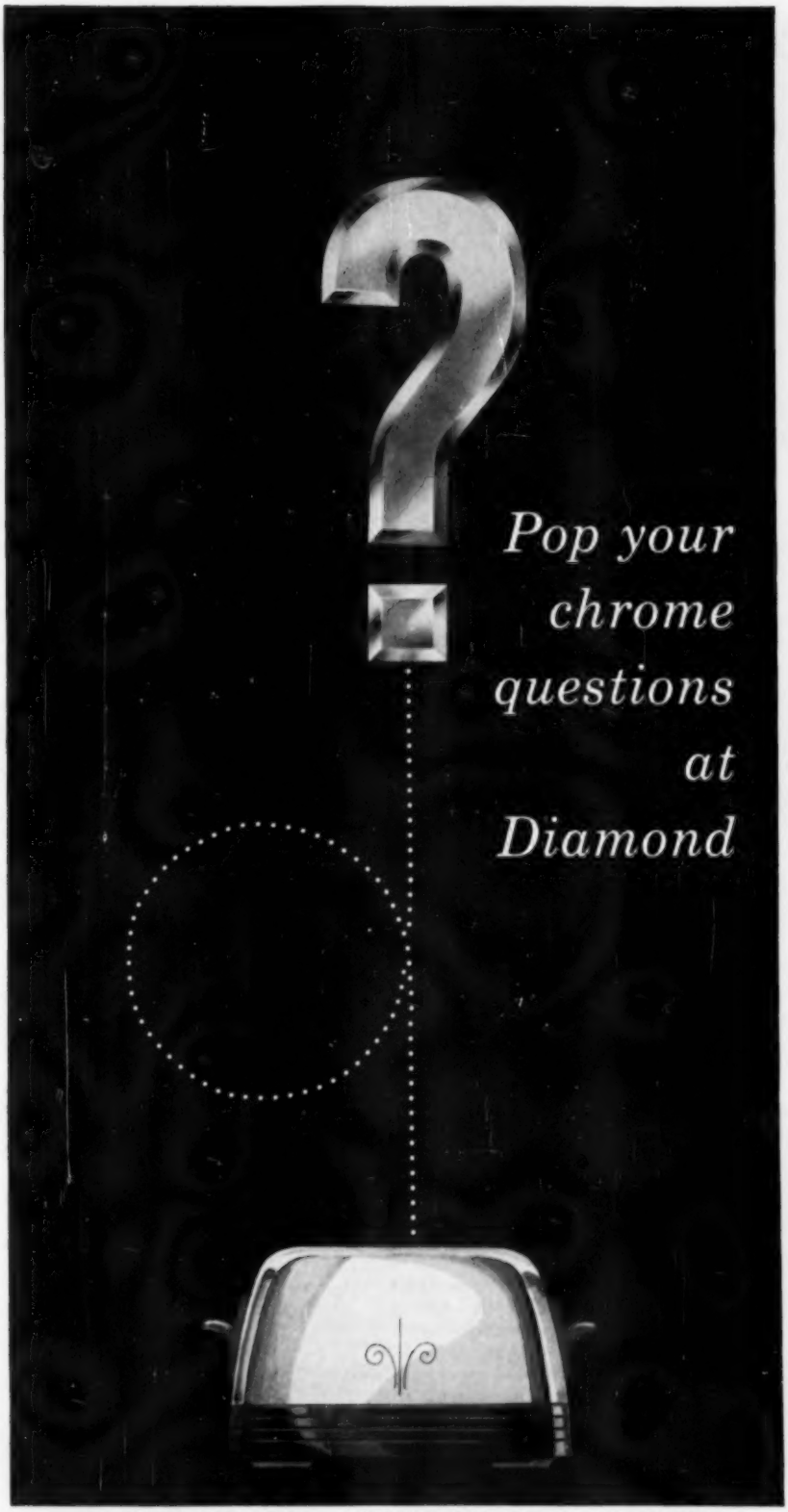
"Spectranalyzed Reagents" (Fisher trade-mark) are all tested on Warren Spectracords (highest-speed spectrophotometer recorders ever developed) and each bottle bears a facsimile of the actual curve for the 220–360 millimicron range. This gives the user tangible, working proof of the low absorbence (or, conversely, the high transmittance) of each reagent in the ultra-violet. These curves are actual, lot analyses not windows of absorbence or maximum limits.

Also announced were two new models



Fisher Spectrophotometer Record

of the Todd Spectranal, recently purchased and now manufactured by Fisher Scientific. The Spectranal, chemists will remember, is a simple spectrum-analyzing instrument for the rapid identification of 61 metallic and nonmetallic elements. Advantages: relatively inexpensive, easy-to-operate, and quite versatile. Chief function: to reduce the time required in preliminary analyses.



DIAMOND CHROMIC ACID

Here at DIAMOND we are all set to pop up with answers to almost any question about chrome plating that comes along. Our Chromium Chemicals Division has experts that do nothing else. And they do it without charge.

Our technical background comes from broad experience. We are in the chrome business up to our ears. For instance, we import the ore, make the soda ash and from there on, control every process in the making of DIAMOND chromic acid . . . extra assurance of uniform quality that helps you to get more uniform, more profitable results.

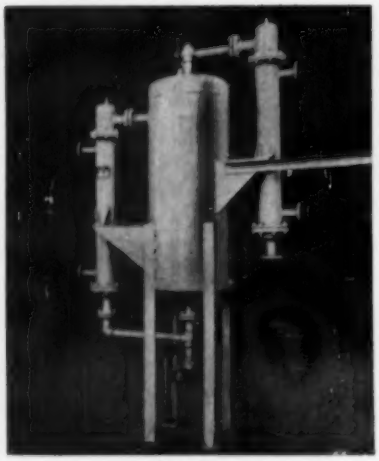
Nine warehousing points and nine sales offices spread across the country assure you fast service and uninterrupted supply. DIAMOND ALKALI CO., 300 Union Commerce Bldg., Cleveland 14, Ohio.

DIAMOND ALKALI CHEMICALS

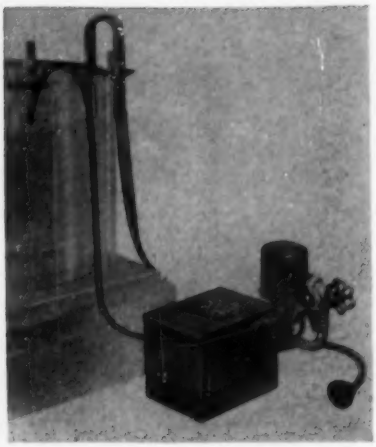
FOR FURTHER INFORMATION, USE READER SERVICE CARD; INDICATE A 1222.

EQUIPMENT & SUPPLIES

Fisher Spectranal



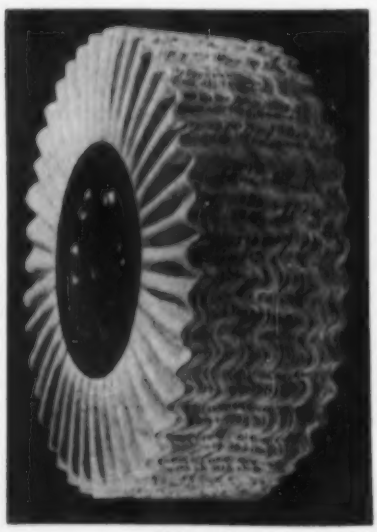
Distiller



Liquid Level Control

E—1218. Air Cooled Bias Buff—A new and completely different type of air cooled bias buffs has been introduced by James H. Rhodes & Co., Chicago, Ill., and Long Island City, N. Y. This patented Buff features such improvements as 45 degree angle fabric biasing which results in 23 per cent more strong warp fibers per inch of fabric on the working surface of the buff, and one-way warp direction for maximum cutting and polishing efficiency.

Uniform convolution pleats, which produce a wiping action and practically eliminate streaking, giving better fabric distribution and perfect balance which does away with down time for balancing polishing heads. Forced air ventilation through air scoops in the center of the buff produce a cooling action in operation. Piano wire stitched for greater safety when operating at maximum speed.



Cool Buff

E—1219. Solvent Reclaiming Still—A solvent reclaiming still, designed to eliminate impurities in solvents and allow their re-use, has been developed by Struthers Wells Corporation.

This standard distillation unit is available for either batch or semi-continuous operation. The Struthers Wells Solvent Reclaiming Still is made in five standard sizes in capacities to 300 gal/hr. The heating medium is steam, with water required for use in the solvent condenser.

The still ordinarily is constructed of carbon steel, but it can be supplied in stainless alloys and nonferrous construction. Design is based on standard stock parts, permitting quick shipment.

E—1220. Melter—Effectiveness of Ice Rem, ice and snow melting pellets, is increased by the addition of a new chemical ingredient, according to Speco, Inc., Cleveland.

The new element, said to retard rust action and increase storage life, consists primarily of a specially formulated "essential" oil.

It is reputed to create a moisture seal within the container and to prevent chemical decomposition. As a result, storage life is lengthened and danger of loss when warehousing between seasons is eliminated.

Use of the new ingredient is also said to stimulate action of Ice Rem's Speconite phosphate-type rust inhibitor. Consequently, it safeguards against excessive rust in the deicing of metal pipes, drains, downspouts, railway switches, metal loading ramps and curbs. When used on drives and streets, it retards rusting on automobiles, trucks, buses and road machinery.

According to the manufacturer, Ice Rem is an activated chemical that has 30 times the thawing capacity of salt. A light sprinkling on slippery surfaces is said to remove ice and snow without harming vegetation, rubber, asphalt and paved surfaces.

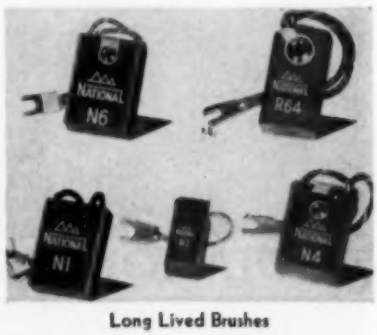
E—1221. Portable Electronic Liquid Leveler—Applicable to all open type liquid containers and operating in any electrically conductive liquid. Blue M's new Portable Electronic Liquid Leveler automatically maintains liquid level of bath mediums within a level constancy of ±0.046 inch.

This completely portable packaged unit includes electronic relay, high and low level stainless steel 18-8 probes, solenoid valve, 36 inches of nickel plated copper tubing and brass needle valve.

Electronic relay contains thyrathron actuated relay. Three micro-amp current flow produces a positive action. Probe circuit isolated from line voltage thru transformer. Power failure or tube burnout automatically cuts relay off.

E—1222. New Brush Series—As another forward step in properly correlating longest brush life with highest degree of commutating ability, National Carbon Company, a Division of Union Carbide and Carbon Corporation, is introducing a complete series of radically new brush grades. This National series is designed to service the complete range of industrial motor and generator application.

National Grade N-1 is a low contact drop brush suitable for a wide variety of equipment throughout a broad voltage



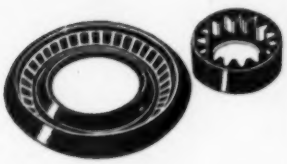
Long Lived Brushes

(*Continued on page 1496*)

AMAZING TENSILE STRENGTH

PERMANENT FLEXIBILITY

CONTINUOUS ADHESION



RUGGED SCUFF RESISTANCE

POSITIVE INSULATION

DURABLE PROTECTION

When...

THEY'RE MICCROSOL COATED

They Meet the Highest Industrial Standards

MICCROSOL E-1003 Heat-Cured Rack Coating is a 100% solids, non-evaporating material that produces a smooth, tough, leather-like coating which will often outlast the rack. Exceptional adhesion is achieved through the use of our primers.

In addition to the outstanding characteristics listed above, tests for abrasion and resistance to all commonly used plating solutions, acids, and caustics show superior performance in comparison to similar products. MICCROSOL E-1003 has proven to excell as a coating for materials-handling equipment, baskets, hangers, and a wide variety of plating equipment parts.

MICCROSOL E-1003 has an exceptionally high gloss, allowing free drainage, and no solution carry-over.

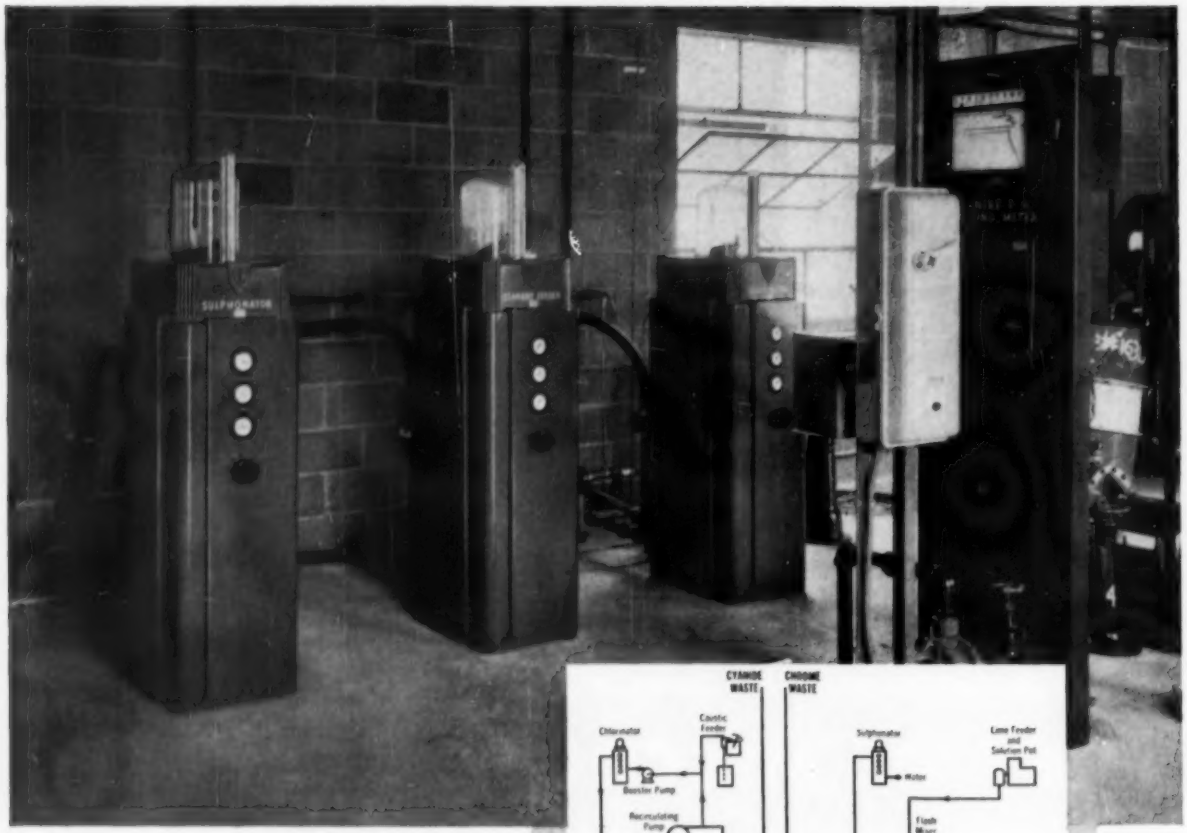
We will be pleased to help you with your coating problems. Send us full particulars.

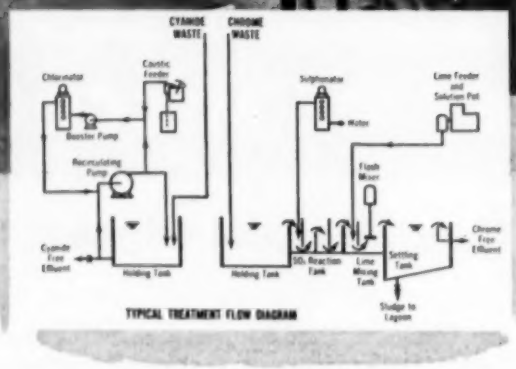
MICCRO Products

MICHIGAN CHROME
and Chemical Company

8611 Grinnell Avenue • Detroit 13, Michigan

FOR FURTHER INFORMATION, USE READER SERVICE CARD; INDICATE A 1223.





TYPICAL TREATMENT FLOW DIAGRAM

DAYSTROM INSTRUMENT DIVISION USES

W&T *Cyanide & Chrome Waste Treatment*

The Daystrom Instrument Division of Daystrom, Incorporated, located at Archbald, Pennsylvania, has provided a compact and efficient treating plant to destroy the toxic components of their plating waste. The treatment plant has been in continuous operation since 1953.

The cyanide bearing waste is treated with chlorine and caustic, using a W&T Water Diaphragm Chlorinator and a W&T Chemical Solution Feeder. The treatment breaks down the cyanide to harmless carbon dioxide and nitrogen gas components.

The chromium bearing waste is treated with sulphur dioxide and lime, using a W&T Sulphonator and a W&T Dry Chemical Feeder. The treatment removes the toxic chromium and other heavy metals from solution, to be disposed of as sludge.

If you would like more information on Wallace & Tiernan cyanide or chromium waste treatment, write for bulletin RA-2120-CP.

WALLACE & TIERNAN INCORPORATED

25 MAIN STREET, BELLEVILLE 9, NEW JERSEY

I-82

FOR FURTHER INFORMATION, USE READER SERVICE CARD; INDICATE A 1224.

LEA COMPOUND

...the start of a leading world-wide business in Surface Finishing Service and Supplies

In the early twenties some revolutionary thinking, tied in with the trade name LEA, sparked major changes in both methods of and materials for polishing and buffing. The basic idea was that surface finishing need not be messy . . . that such operations could and should be clean. Revolving initially around Lea Compound, the first greaseless abrasive composition made available to industry, and later around other LEA compositions of comparable quality, new abrasive finishing procedures resulted in either better finishes, lower cost finishing, or both.

Yes, Lea Compound surely did revolutionize both finishing methods and materials!

Today, Lea Compound is used all over the world and is available in many kinds and grades of abrasives. It is complemented by LEAROK, the bright finishing bar with "no-free-grease"... by LEA Liquabrade, industry's noted liquid abrasive . . . and a host of buffing and polishing specialties. LEA methods are now used by many of the largest plants with finishing production lines.

The salient point to remember when you deal with LEA — for both service and supplies — is that you are dealing with long established and thoroughly experienced Surface Finishing Specialists.

LEA COMPOUND and its family of FINISHING SPECIALTIES

LEAROK . . . industry's "no-free-grease" buffing composition.

LEA LIQUABRADE . . . safe, uniform, stable spray liquid buffing composition ideal for production line work.

LEABRAMENT . . . quick drying, liquid spray abrasive for burring, polishing or satin finishing.

AD-LEA-SIVE . . . glue base adhesive for sizing flexible polishing wheels.

LEA GRIPMASTER . . . polishing wheel cement.

LEA LIQUALUBE . . . water soluble polishing wheel and belt lubricant.

LEATARDENT . . . stain and tarnish preventive for plated surfaces.

LEA KROMSAVERS . . . mist loss preventive for plating solutions.

LEA LAPPING PASTE . . . micron size controlled abrasive paste for fine surface finishing.

plus

Superior Plating Solution Addition Agents for copper, nickel, cadmium, gold, silver, brass, etc. . . . developed by Lea-Ronal, Inc.

Burring, Buffing, Polishing, Lapping, Plating and Spray Finishing . . . Manufacturers and Specialists in the Development of Production Methods, Equipment and Compositions. Manufacturers of Lea Compound and Learok . . . Industry's quality buffing and polishing compounds for over 30 years.

THE LEA MANUFACTURING CO.
16 CHERRY AVE., WATERBURY 20, CONN.

Reviewing

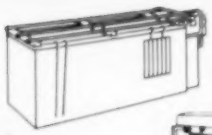
Lea-Ronal

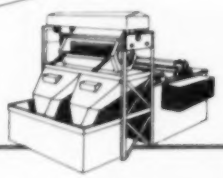
PLATING SPECIALTIES

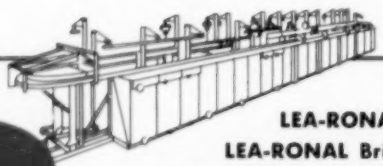
Each helps to provide

BETTER PLATING

LOWER COST or BOTH







Here are the Big 8

LEA-RONAL Bright Copper
LEA-RONAL Bright Acid Copper
LEA-RONAL Bright Nickel
LEA-RONAL Bright Silver—Industrial
LEA-RONAL Bright Silver—Decorative
LEA-RONAL Bright Gold—Industrial
LEA-RONAL Bright Gold—Decorative
LEA-RONAL Bright Cadmium

PLUS ADDITIVE AGENTS

SUPERTARTRAL: better and more economical than Rochelle Salt.

CUPRALL: maximum speed of copper deposition, improved buffability.

WATERSHED: free rinsing and fast drying; reduced or eliminated spotting.

WETTING AGENT CW-6: usable in *all* cyanide copper baths; stable, free rinsing.

TST PURIFIERS: greatly increased tolerance to chromium and zinc in cyanide baths.

LEA NICKEL-GLO: a 'no sludge' agent for barrel plating; minimized or eliminated burnishing of small parts.

LEA MIRRO-GLO: similar to Nickel-Glo but for still tank plating.

These are *all* superior products, proving in production that they do a stand out job of providing better plating, more economical plating or *both*. It will pay you to get *all* the facts. When writing, it would help if you would send data concerning your plating problems. Sample, if possible.

Watch our advertisements for announcement of several new developments.

The
LEA GROUP
serving the Finishing Field
Lea-Ronal, Inc., Jamaica, N. Y.
Lea-Michigan, Inc., Detroit
The Lea Mfg. Co., Waterbury, Conn.
Lea Mfg. Co., of Canada, Toronto
Plating Polishing Buffing Burring

Lea-Ronal!

Sales and Manufacturing Plant
237 East Aurora Street, Waterbury 20, Conn.
Main Office and Laboratory
139-29 Linden Avenue, Jamaica 35, N. Y.

REPORTS FROM ALL OVER
. . . stripped, cleaned and degreased

(This section is especially compiled for the readers of PLATING; here the world in which we work and operate is stripped of its veneer, cleaned of its distortions and carefully degreased of superfluities.)

From a relatively low level early this year, capital spending ha- climbed so steadily that fourth quarter spending is setting an all-time high. The year as a whole will come very close to 1953's record $28.3 billion. The trend is *up*. Next year could see all previous records beaten. The *need* (competition, obsolescence, rising labor and material costs) and the *means* (more favorable depreciation rules, big sales and profits) will be an even bigger spur next year. Incidentally, the rise in capital spending will continue to be an offset to declines or slower advances in other parts of the economy.

P. J. Topelian reports a new chrome plating process which deposits highly ductile coatings. Heavy dense hard chromium deposits can be plated directly on aluminum resulting in excellent intermetallic bond strength. Deposits are highly ductile, provide high resistance to distortive bending and torsional and impact loading.

A convenient new system of ultraviolet treatment yields water that is free from harmful organisms at a cost stated to be as low as a cent for 25,000 gallons.

MIT has completed and reported practical applications of grinding principles. Their analysis and equations are used to indicate variables which should be changed when trouble is encountered.

The Aluminum Company of America now offers fabricators, their choice of eight different "sealed-in" colored aluminum milled products.

E-2, a new-type of pH sensitive glass, is said by Beckman Instruments Inc., Fullerton, California, to be suited especially for high pH measurements. Electrodes made of it are extremely valuable above pH 10, and are good from 0-14 pH at 15-100C.

A hydrogen probe was introduced by Texsteam Corp., Houston 11, as a safety device to reveal existence of hydrogen blisters which would be corroding the walls of a metal tank in which chemical reactions are taking place.

Recent trials of an improved autooxidation recovery method yield sulfuric acid from waste pickle liquid. The British Iron and Steel Research Asso., in a pilot plant reports production of an acid up to 40 per cent conc. With a plant handling 10 tons of acid per day and upwards, valuable savings can be achieved in pickling costs.

The Leybolt-Bochumer Verein AG German process for removing hydrogen from steel via a vacuum chamber now is available in the U.S. through Nat'l. Res. Corp., Cambridge, Mass. The method is said to make it possible to handle 150-ton ingots.

The amount of money invested per production worker in the metal working industries now is $12,500, according to the Machinery Inst.

edavis

ALUMINUM—(99 per cent pure plus ingot)	24.40
CADMIUM—(Platers' quotation)	$1.70
CHROMIUM—Electrolytic Cr. (99 per cent). Fe (0.3 per cent max).	
C (.20 per cent max)	$1.27
Less than ton lots	$1.29
COPPER—Electrolytic, domestic	43.00
GOLD—per oz U. S. price)	$35.00
LEAD—(Common, New York)	15.50
MAGNESIUM—(Ingot, F.O.B. Newark)	34.70
(Sticks, 1.3 in diameter, 100 lbs or more)	53.00
MERCURY—(per 76 lb small quantities)	$278.00-283.00
NICKEL—(F.O.B. Port Colborne U. S. Duty Included)	64.50
Electrolytic Cathode (sheets loose)	64.50
PLATINUM—(refined per oz)	$97-99.00
RHODIUM	$120.00-125.00
SILVER—New York (per oz)	90.50
TIN—New York	99.00
ZINC—Hygrade (delivered)	14.35

READER SERVICE CARD

December 1955. Do not use after February 15, 1956

Please send me information on the following—

Ads: A.....	A.....	A.....	A.....
E. and S.: E.....	E.....	E.....	E.....
Tr. Lit.: L.....	L.....	L.....	L.....

Name.....Position or Title.....

Company.....

Company Address.....

City.....Zone.....State.....

REQUESTS FORWARDED PROMPTLY TO PROPER SOURCE

First Class Permit No. 4031, Sec. 34.9, P.L.&R. Newark, N. J.

BUSINESS REPLY CARD

No Postage Stamp Necessary if Mailed in the United States

Postage Will be Paid by Addressee

AMERICAN ELECTROPLATERS' SOCIETY

445 BROAD STREET

NEWARK 2, NEW JERSEY

Please send me the following

..... ☐ AES Member

..... ☐ Non-Member

..... This card is for ordering ASTM-AES Specs and Standards, Books and Covers

.....

.....

Enclosed is check ..... for $ ..... (Payable to American Electroplaters' Society)
money order

Name .....

Company Name ..... Title .....

Address .....

City ..... Zone ..... State .....

If Non-Member ☐ Please send me literature about the American Electroplaters' Society

Postage Will be Paid by Addressee

BUSINESS REPLY CARD
No Postage Stamp Necessary if Mailed in the United States

PLATING
445 BROAD STREET
NEWARK 2, NEW JERSEY

Attn.: Reader Service Department

First Class Permit No. 4032, Sec. 34.9, P.L. & R. Newark, N. J.

An AES sponsored Research Project is brought together in this soft-bound saddle-stitched booklet. Here are all the results of the study in an easily usable form.

$ .75 to AES members

$1.00 to non-members

SPECIFICATIONS AND TESTS FOR ELECTRODEPOSITED METALLIC COATINGS*

FREE—USE READER'S SERVICE CARD

**Sponsored by ASTM and AES*

STANDARDS RELATING TO ELECTRODEPOSITED METALLIC COATINGS

Specifications for:

A 164-53.	Electrodeposited Coatings of Zinc on Steel
A 165-53.	Electrodeposited Coatings of Cadmium on Steel
A 166-53 T.	Electrodeposited Coatings of Nickel and Chromium on Steel (Tentative)
B 141-45.	Electrodeposited Coatings of Nickel and Chromium on Copper and Copper-Base Alloys
B 142-53.	Electrodeposited Coatings of Nickel and Chromium on Zinc and Zinc-Base Alloys
B 200-53 T.	Electrodeposited Coatings of Lead on Steel (Tentative)
B 201-49 T.	Chromate Finishes on Electrodeposited Zinc, Hot-Dipped Galvanized, and Zinc Die-Cast Surfaces (Tentative)

Methods of:

A 219-51 T.	Local Thickness of Electrodeposited Coatings, Test for (Tentative)
B 117-49 T.	Salt Spray (Fog) Testing (Tentative)

Recommended Practices for:

B 177-49.	Chromium Plating on Steel for Engineering Use
B 183-49.	Low-Carbon Steel for Electroplating, Preparation of
B 242-53.	High-Carbon Steel for Electroplating, Preparation of
B 252-53.	Zinc-Base Die Castings for Electroplating, Preparation of
B 253-53.	Aluminum Alloys, Preparation of and Electroplating on
B 254-53.	Stainless Steel, Preparation of and Electroplating on
B 281-53 T.	Copper and Copper-Base Alloys for Electroplating, Preparation of (Tentative)

ELECTROS

$2.50

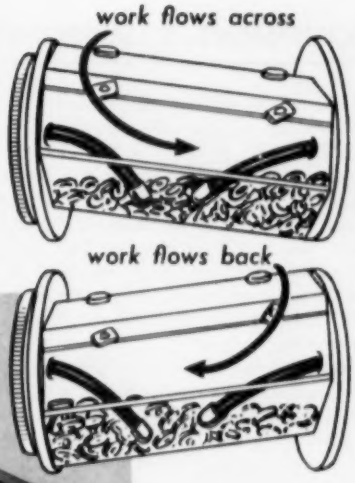
$3.00

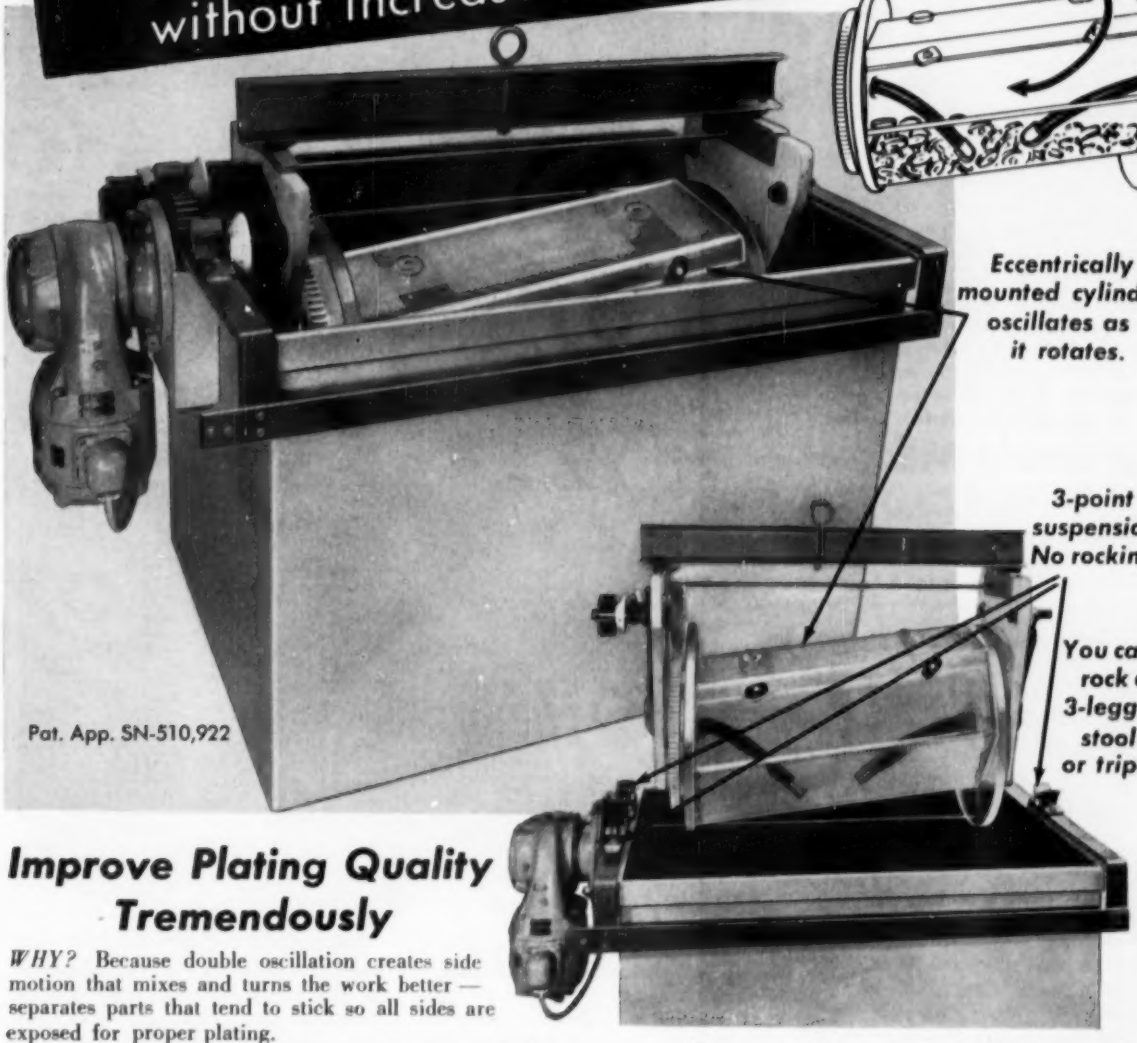
ALL ITEMS HERE ARE SHOWN ACTUAL SIZE

FOR
- LETTERHEADS
- ENVELOPES
- CARDS
- PROGRAMS
- AND MANY OTHER USE

BELKE DOUBLE OSCILLATING Plating Cylinders

Increase mixing action without increase in speed.




Eccentrically mounted cylinder oscillates as it rotates.
3-point suspension No rocking
You can't rock a 3-legged stool or tripod.
Pat. App. SN-510,922

Improve Plating Quality Tremendously

WHY? Because double oscillation creates side motion that mixes and turns the work better — separates parts that tend to stick so all sides are exposed for proper plating.

A specified thickness is obtained quicker with no over-plating or underplating.

WHY? Because the work moves back and forth across the cylinder. None remains shielded by the cylinder ends as happens with conventional barrels. Consequently all work is equally exposed and receives equal deposit. It is not necessary to over-plate some of the work in order to adequately plate the rest.

You can replace present cylinders with BELKE Double Oscillating Cylinders.

BELKE Double Oscillating Cylinders are made in all sizes from 14x30 regulars to 6x12 portables.

They are available as replacements for present cylinders or as complete plating units.

They can be furnished with BELKE non-rocking 3-point suspension as illustrated or with conventional 4-point suspension.

Double oscillation soon pays for new cylinders by saving in time and materials. Order a BELKE Double Oscillating Cylinder and see the big difference.

Belke Manufacturing Company
947 N. Cicero Ave., Chicago 51

EVERYTHING FOR PLATING PLANTS

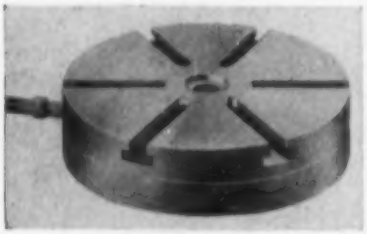
range. It has especially desirable characteristics for enclosed mill type motors.

National Grade N-2 and N-6 were designed specifically for electrical machines operating at high temperatures which must be dissipated by radiation. They have been successfully applied to a wide range of commutating requirements in totally enclosed, general purpose motors and generators having Class H (silicone) insulation.

National Grade N-4 is the first general purpose industrial brush. It is especially recommended where heavy load-swings require exceptional brush characteristics to assure smooth, trouble-free operation and peak commutation under all service conditions. This new brush embodies all the desirable properties necessary to proper commutation.

National R-64 is particularly adapted to d-c excitation rings for the newer types of high speed turbo-generators, as well as small and medium size machines. It has unusually long life in this severe service involving extremely high surface speeds.

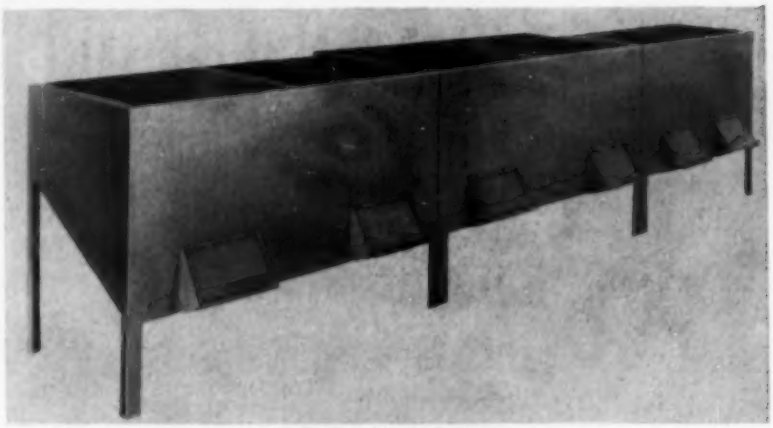
E—1223. Gal With JATO Table Lifts Tons—A new labor saving device,offered by J. C. Hartley Associates, Branford, Conn., now makes it possible for a female worker to move by hand, work



Floats Tons

pieces weighing several tons through many stations without straining a muscle or requiring male assistance. The principle of this new table is simple. Whenever a heavy work piece and fixture must be moved or indexed it is simply floated on air.

Errata—The picture labeled "HCl Absorbers" which appeared on page 1390 of the November issue was improperly placed. A glo-quartz heater was shown, and the picture of the absorbers was not run. We hope to rerun the item with the correct picture in the January issue—if the gremlins that creep into these things will let us.



Al_2O_3 Chip Bin for Tumbling

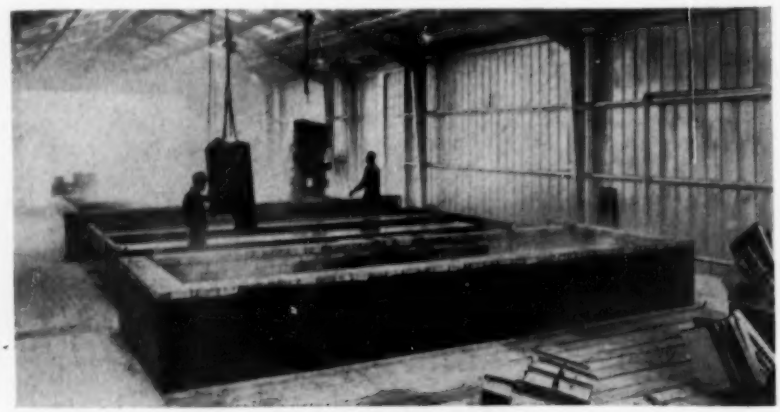
E—1224. Chip Bins—"Lorco" two-compartment bins to hold aluminum-oxide chips for barrel tumbling are furnished with gates that assure positive control of the chip flow. Each gate is raised outwardly in a short arc from the wall of the bin so that the action of gravity will prevent any chips from interfering with the closing of the gate. The entire gate assembly is replaceable when worn.

The bins are furnished in three sizes:

No. 2B–22 has two 22-cu-ft compartments, holding approximately 1,400 lb of chips.

No. 2B–30 has 32-cu-ft compartments, each holding approximately 2,000 lb of chips.

No. 2B–40 has 40-cu-ft compartments, each holding approximately 2,600 lb of chips.



Quick + HVWM = Efficiency

E—1225. Assembly-Line Layout Boosts Galvanizing Production—Metal parts move by overhead conveyor through pickle and rinse tanks before being galvanized at Quick Industries' new plant at Jackson, Mich.

Improved conveying methods and modern production line layout were developed by Quick and Hanson-Van Winkle-Munning Co., Matawan, N. J., manufacturer of metal-finishing equipment and supplies.

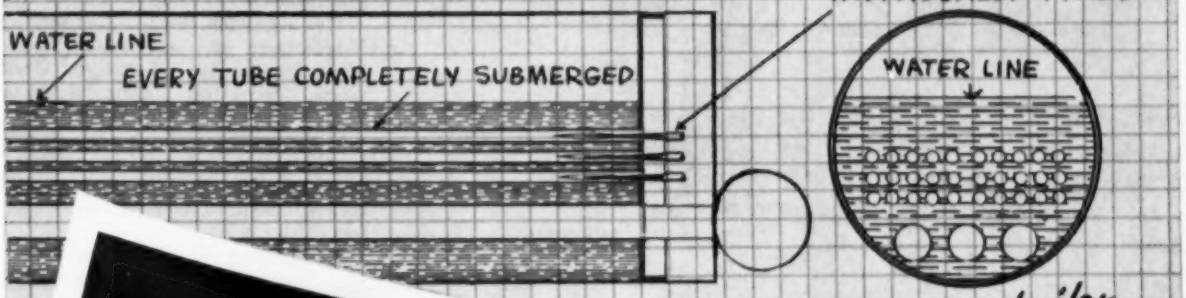
Sheet assemblies, pipe coils, pole line hardware and water tanks are galvanized at rates of 2500–3000 lb/hr, twice Quick's former output. In addition, Quick says it is preparing and pickling parts more effectively now and getting brighter zinc coatings as a result of improved processing.

Work is carried by electrically operated hoists on a monorail through a sulfuric acid pickling bath, double rinse bath, flux wash and galvanizing dip.

E—1226. Relining Service for Glass-Lined Equipment—The General Ceramics Corporation of Keasbey, N. J., announces a new fast service for the relining of glass-lined chemical equipment.

Glass-lined tanks, kettles, reactors, valves and all other types of chemical equipment can now be relined quickly and economically. The development of an unsurpassed acid and alkali resistant enamel by Keasbey Corporation, a General Ceramics affiliate, makes it possible.

when you buy a steam boiler . . . be sure to look at the picture of a Sellers Immersion Boiler



There's no other boiler like a Sellers—

every square foot of heating surface is water backed—100% effective!

The long, individually gas fired tubes in the Sellers Immersion Boiler are all completely submerged nearer the water level—and over the return tubes! Heat is therefore uniformly distributed through them—and directly into the water—no where else!

there's no scale problem!

In immersion heating, the needed long tubes expand and contract sufficiently on intermittent firing to crack loose any hard scale that forms on the tubes. This practically eliminates the scale problem, makes maintenance simpler and increases the boiler's efficiency.

the average flue gas travel is 15 feet!

Maximum, almost complete utilization of the exhaust heat is assured with a Sellers Immersion Boiler. This is a result of Sellers exclusive design—with the firing tubes completely submerged and *located over the return tubes*, there is a long, slow flue gas travel—an average of 15 feet! Heat can only go into the water.

There's no other steam boiler like a Sellers Immersion Steam Boiler. Its simple design gives you a package boiler unit with many other outstanding features. Minimum maintenance and maximum efficiency combine to give you years of remarkably low operating costs. Twelve sizes available!

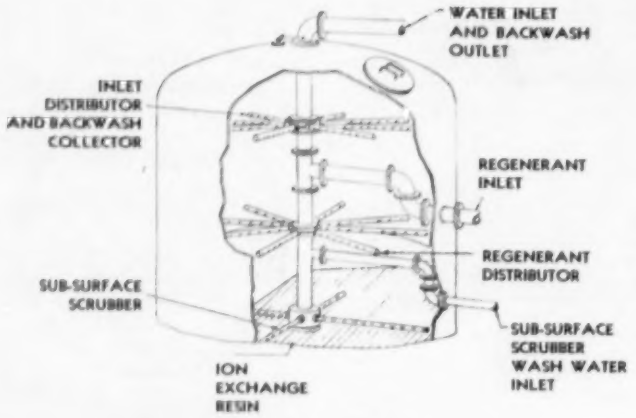
SEND FOR BULLETIN 1206 C-00
Your letterhead will bring you this tell all, dollar saving story on all 12 sizes.

Sellers ENGINEERING CO.

4876 N. CLARK STREET CHICAGO, ILL.

Blast Heaters • Immersion Automatic Water Heaters • Combustion Units • Industrial Gas Burners
Vertical Steam Boilers • Immersion Tank Heaters • Gas Combustion Equipment

EQUIPMENT & SUPPLIES



Sub-Surface Washer

The world's most economical gold plate...

Sel-Rex Bright Gold Process

The new "GOLD STANDARD"

SAVES YOU MONEY 5 WAYS

1 . . . produces a mirror-bright finish directly from the bath regardless of thickness requirements—eliminates costly, wasteful scratch brushing and buffing.

2 . . . assures a uniform thickness even on edges, in crevices and "blind holes"—has far greater "throwing power" than any other gold plating process.

3 . . . gives 40% more resistance to wear and abrasion—has twice the hardness of conventional 24 karat gold plate.

4 . . . gives six times greater protection with ⅙ the amount of gold . . . because it produces denser deposits than any other process — proved in salt spray tests under standard ASTM conditions.

5 . . . costly rejects due to altered or deformed contours (common in conventional gold plating) reduced to the barest minimum — has a unique physical property which assures consistently smooth, uniform deposits.

The new SEL-REX BRIGHT GOLD solution operates at room temperature and is simple and easy to maintain. No special equipment required.

Hundreds of successfully operating installations, both decorative and industrial, prove that SEL-REX BRIGHT GOLD has rendered all other 24 KT. gold plate obsolete.

Free technical literature on request

BRIGHT GOLD PLATING PROCESS
HIGH SPEED SILVER PLATING PROCESS
BRIGHT RHODIUM PLATING PROCESS

SEL-REX PRECIOUS METALS, INC.
229 MAIN STREET • BELLEVILLE 9, N. J.
Newark Detroit Los Angeles

E—1227. New Device for Effective Backwashing—Graver Water Conditioning Co., N. Y., in conjunction with several plants throughout the country, has developed a new and effective method of combatting certain backwash difficulties occurring in filtration and ion exchange materials.

This innovation, a sub-surface washer, is being used with great success in demineralizers, zeolite softeners and filters experiencing excess fouling of beds. Many waters not turbid enough to justify clarification still contains enough soluble solids to plug softeners and filters. In such cases ordinary surface washing devices become inadequate and proper backwashing is hindered.

Difficulties of this sort can be encountered in many demineralizing and ion exchange installations.

E—1228. Graver Employs Rainbow in Equipment Coatings—A unique new method of corrosion protection for equipment is now being utilized by the Graver Water Conditioning Co., New York, N. Y. Graver designs and manufactures a complete line of equipment for the treatment of industrial, municipal and industrial waste waters. The wide range of liquids and chemicals handled by such equipment occasionally calls for special protection against corrosion.

Several excellent coatings have been developed by the paint industry for this purpose, selection depending upon the nature of the corrosive liquid to be handled. The initial coating is applied at time of equipment installation and then reapplied later after normal deterioration and wear. It is this reapplication which sometimes presents a problem since it's not always possible to determine how much protection has worn off or whether certain parts have suffered more wear than others.

To combat this difficulty Graver applies 5–7 coats of paint at installation time *using successively different colors for each coat.* Thus, as the protective coating wears off, the operator can tell at a glance, from the color showing, just how much wear has occurred, how much protection remains, and which parts or sections have received more wear than others. He will know exactly when recoating of all or part of the equipment is necessary.

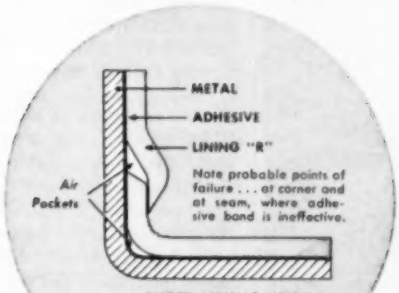
Graver has found this system to be highly successful with its solids-contact unit, the Reactivator. The Reactivator, for example, is used to treat brine for reflooding operations in the oil fields and also acid wastes from plating operations—both highly corrosive. This "rainbow" system has also proven most effective when used with Graver gravity filters and Graver chemical storage and feeding tanks.

E—1229. Critical Materials Conserved by "Chromallizing"—Chromallizing, widely known and used in Europe but only recently emerging from the experimental

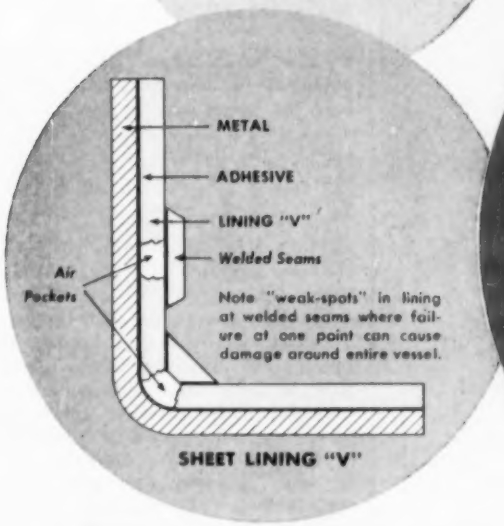
For positive protection against chemical attack, specify*

A and P FINISHING TP-111

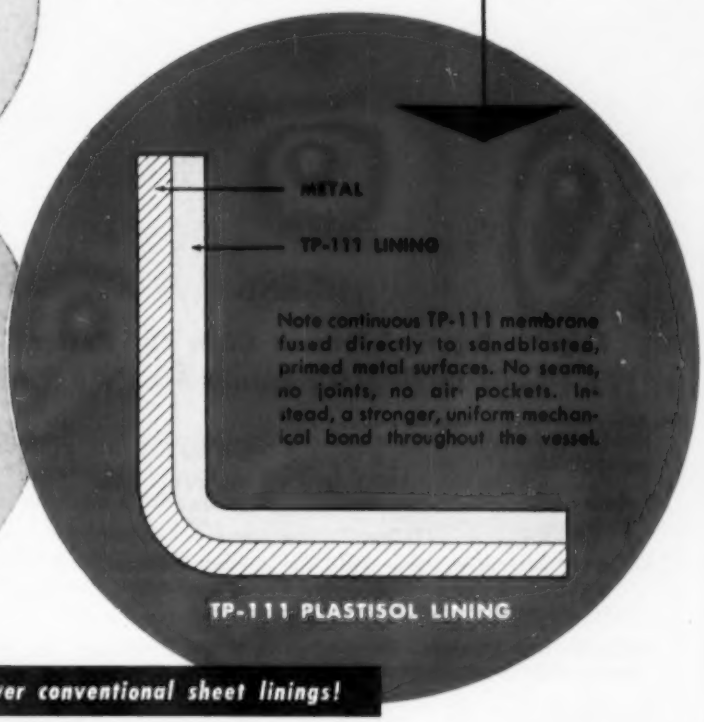
the improved sprayable plastisol that forms a continuous, seamless protective lining fused directly to the primed metal surfaces of your plating and processing equipment


METAL
ADHESIVE
LINING "R"
Air Pockets
Note probable points of failure . . . at corner and at seam, where adhesive bond is ineffective.

SHEET LINING "R"


METAL
ADHESIVE
LINING "V"
Welded Seams
Air Pockets
Note "weak-spots" in lining at welded seams where failure at one point can cause damage around entire vessel.

SHEET LINING "V"


METAL
TP-111 LINING
Note continuous TP-111 membrane fused directly to sandblasted, primed metal surfaces. No seams, no joints, no air pockets. Instead, a stronger, uniform mechanical bond throughout the vessel.

TP-111 PLASTISOL LINING

Compare the advantages of TP-111 over conventional sheet linings!

● **CONTINUOUS MEMBRANE**—As applied by A & P Finishing specialists, TP-111 forms a continuous membrane lining completely free of the joints, seams, and air pockets normally found in conventional sheet linings. Such breaks in a lining are generally considered weak spots where failure would permit liquid to flow to various parts of the vessel, causing extensive damage and loss of current density.

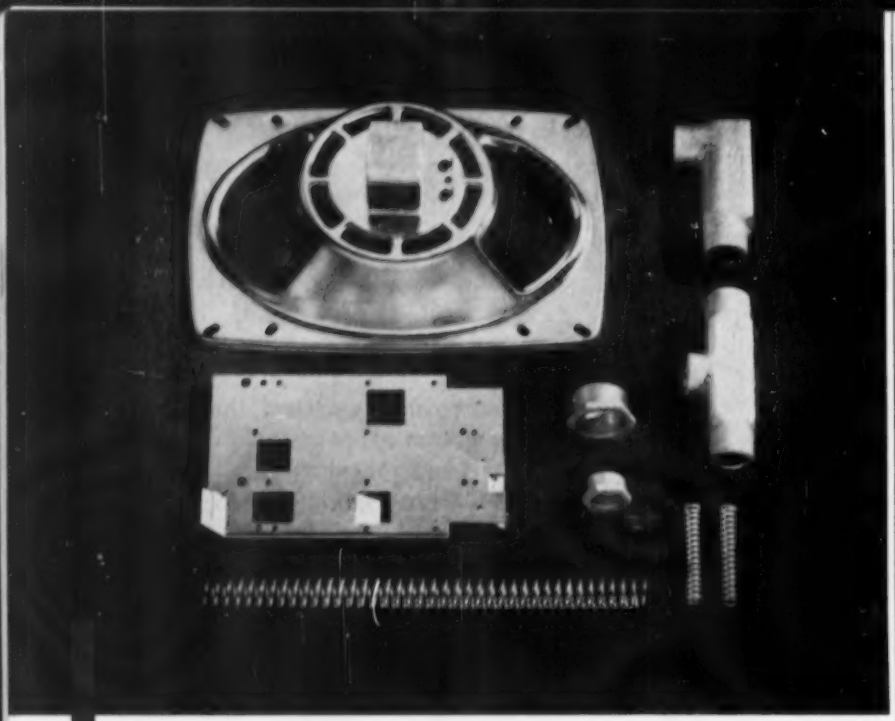
● **STRONGER BOND**—A & P Finishing TP-111 is fused directly to primed, sandblasted metal surfaces . . . thus effecting a stronger mechanical bond than that produced by adhesives used with conventional linings. This also permits use of TP-111 on higher temperature applications where adhesives are apt to soften causing a separation of the sheet lining from the base metal. Further, in the event of accidental damage to the TP-111 lining, chemical attack and undercutting is localized.

● **CONTROLLED HARDNESS**—The film hardness of TP-111 can be controlled to meet individual job requirements by A & P Finishing specialists. In addition, greater chemical and abrasion resistance can be effected through formulation and curing techniques which produce an unusually dense and durable membrane.

* ***POSITIVE PROTECTION*** — Protective linings are only as effective as the method by which they are applied. That's why it pays to insist upon proven A & P Finishing TP-111 linings as installed in our plant by workmen recognized as pioneers in this field. All work guaranteed and surprisingly low in cost. Available, too, through equipment manufacturers and plating jobbers. Write for details today!

A and P FINISHING AND MANUFACTURING CO.

17760 CLARANN AVENUE
MELVINDALE (Detroit) MICHIGAN
Telephone WArwick 8-7515



A FINER CADMIUM PLATING PROCESS

Udylite Bry-Cad Process Gives the Faster and Brighter Cadmium Finish

Newly developed by Udylite research, Bry-Cad offers many interesting applications for cadmium plating.

Springs—Bry-Cad provides excellent protection with a minimum of hydrogen embrittlement.

Electronic Assemblies—Bry-Cad's low electrical contact resistance is highly desirable on assemblies put together with fasteners. An excellent surface for rapid soldering.

Malleable Iron Castings—Bry-Cad gives unusual coverage not obtainable with similar rustproofing finishes.

Stainless Steel Aircraft Parts—Bry-Cad does not cause embrittlement of stainless steel parts subjected to high temperature.

Udylite Bry-Cad has other advantages such as: High cathode efficiency, simplicity of operation and control, attractive finish with less tendency to finger mark, a self-lubricating metal and good resistance to mild alkalies. Bry-Cad is easily adapted to plating in barrels, hand operated tanks, semi-automatics or full automatic machines.

The Udylite Bry-Cad process is just one of the many electroplating processes pioneered by Udylite. Whether your need is for a process, equipment or supplies—be sure to consult your Udylite representative or fill out coupon and mail to us direct.

WORLD'S LARGEST PLATING SUPPLIER

Please have a sales representative call on us concerning Udylite's Bry-Cad plating process. Have him ask for:

NAME _____

COMPANY _____

STREET _____ ZONE _____

CITY _____ STATE _____

THE Udylite CORPORATION
DETROIT 11, MICHIGAN

laboratories to the production lines in this country, is a relatively new process for increasing the heat, wear and corrosion resistance of ferrous metals by high temperature diffusion of chromium into the surface.

During the high temperature exchange reaction, chromium diffuses inward to form a true alloy layer that does not spall, peel or flake. The Chromalloy process can develop a ductile case (0.001 to 0.003 inch) of chromium on low carbon steel or a thin (0.0002 to 0.0010 inch), extremely hard (VPN 1800) chromium carbide case on steels of medium to high carbon content.

Although ductile cases may run as high as 50 per cent chromium at the surface, the extremely limited depth of the chromium greatly conserves critical alloying materials, permitting the use of low carbon steels in the performance of the same functions as 400 series stainless steel.

E—1230. Mesh Abrasive Cloth—Newly developed mesh abrasive cloths are taking over the job of sanding and polishing metal, wood and plastic surfaces in U. S. and Canadian industry, from sandpaper, emery cloth and other conventional materials.

The rayon cloth is covered on both sides and through its mesh openings by abrasive particles, or grits, of aluminum oxide or silicon carbide. The grits are bonded to the cloth by a waterproof resin.

Among hundreds of other applications, the new mesh abrasive cloth now is being used to finish and polish automobile bodies, aluminum extrusions, yachts, airplane parts, pottery, dies, delicate instruments and even to clean restaurant cooking grills. It is being used extensively in machine shop applications, and new uses are being discovered continually.

A prime factor contributing to the mesh abrasive cloth's performance is the fact that the cloth's open pores permit passage and elimination of the sanded particles. That removes the drawback of sandpaper and other abrasive cloths, whose coated surfaces become clogged and thereby reduced in effectiveness.

Other advantages of the mesh abrasive cloth are the rugged abrasive qualities of its grits, the strength of the fabric itself, the presence of grits on both sides of the fabric as well as through its openings, and the vise-like bond of the grits to the cloth by the action of the resin on the fabric's adhesive finish.

Gritcloth is supplied to industry in sheets, discs and rolls for use in various hand and machine sanding operations. New forms of the cloth, with a wider variety of grits, are being developed constantly to suit a wider range of applications.

E—1231. Electronic Humidity Controller—A small, low-priced electric hy-

grometer humidity controller known as the Humistat, is available. The Humistat (patent pending), so-named because it is the electronic successor to mechanical humidistats, automatically operates large or small humidifiers, dehumidifiers, and air conditioners to maintain humidity control within plus-minus 1.25 per cent relative humidity. The Humistat is so sensitive that the moisture from a person's hand will operate it.

For maximum sensitivity and versatility, the relative range of 5 per cent to 95 per cent is covered by individual sensing elements with operating ranges of about 15 per cent relative humidity.

Humidity control settings within each element range are made in a few seconds. A calibrated resistor is plugged into the Humistat and a potentiometer knob is turned until a click is heard. The Humistat is thereby set for a specific humidity control point independent of the sensing element and without recourse to calibration devices.

The Humistat employs the time-proven famed Aminco-Dunmore Electric Hygrometer Sensing Element, over 100,000 of which are in continuous world-wide use. The sensing element is mounted inside the Humistat case for maximum compactness. The complete controller is about the size of a quart carton of milk.

E—1232. Hardfacing Paste for High Hardness—Hardfacing pastes which can be applied without special skill to impart a deposit of high hardness and excellent abrasion resistance has been developed by Western Carbide Corp., subsidiary of Superweld Corp., No. Hollywood, Calif.

According to Robert E. Jones, Western Carbide president, Hi-C 60 "Ruf-Nek" paste introduces an entirely new concept of hardfacing. Available in tubes or jars, the new paste can be used on any metal whose melting point is higher than that of the paste (1850° F). Using gas flame, it can be applied to metal of less than ¼ in thickness; with proper induction heating, any thickness of metal can be hardfaced. The paste is expected to be of great value in manufacture and maintenance of farm tools, earthmoving equipment and general industrial use. Numerous potential applications also exist in automotive, electronic and other industries.

A permanent suspension of powdered hardfacing alloy in a water base solution, "Hi-C 60" can be applied by spatula, brush, or by extrusion from a tube. The paste is deposited in a layer up to 3/4 in on the surface to be hard-faced. Heating the base metal by flame, or high-frequency induction up to the fusion point of the paste, causes the paste to fuse and bond to the base metal. The hardness of the treated surface ranges from 55 to 61 on the Rockwell C scale.

INDICATE A 1230.

MARCHANT GOES AUTOMATIC IN PLATING

Udylite Automatic Plating Machine Brings Big Savings to Calculator Maker

The same benefits Marchant Calculators, Inc., enjoy from the installation of a Udylite automatic plating machine can be yours—and for only a modest capital investment.

Better process control, reduction in operating and maintenance costs and improved work quality are the result of Marchant's installation of a Udylite Junior Full Automatic. In addition, they are now experiencing better ventilation, better and safer working conditions, manufacturing control with built-in instrumentation, greatly reduced materials handling and a minimum of rejects.

When the time came to install new plating facilities for their expanding business, Marchant naturally turned to Udylite. After a study of the Marchant problem Udylite engineers recommended the Udylite Junior with an automatic load and unload conveyor for the cadmium plating to fine tolerances of the many parts of the Marchant Calculator.

And so, another business friendship has been formed.

We at Udylite can help you improve quality and save money in your metal finishing operations. For quick response fill in the coupon below.

WORLD'S LARGEST PLATING SUPPLIER

We are interested in Udylite Automatic Equipment for our metal finishing operations. Have your salesman call.

NAME

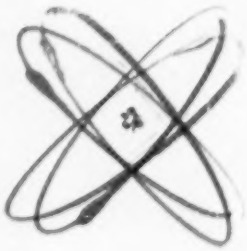
COMPANY

STREET ZONE

CITY STATE

THE Udylite CORPORATION
DETROIT 11, MICHIGAN

CORPORATION
DETROIT 11, MICHIGAN



THE WRAPPING

There comes a season every year when gay wrappings are the order of the day. Too often, people buy their wrapping paper without thought to the expression it will convey. They seem intent only on making packages that will be pretty to look at and bring color to the recipients.

We thought we needed a wrapping for PLATING this year. We searched the existing samples and found nothing that suited. We talked with many members of the AES and learned little except that they were enthusiastic and forward-looking. We investigated the reactions of scientists and found them absorbed in their field.

Then we looked at the past year's issues of PLATING. There was the answer. Here is a magazine that is healthy, young, happy, spritely, vivid and courageous. Here is a magazine that speaks of, for and through men who are engaged in industries which hold the symbols of today's modern world.

We've taken the symbols, sprinkled them onto the purity of a white background and we have a serious yet gay wrapping that could be used for any present. We think it symbolizes the magnificent gift which the AES gives to the metal finishing industries of the world.

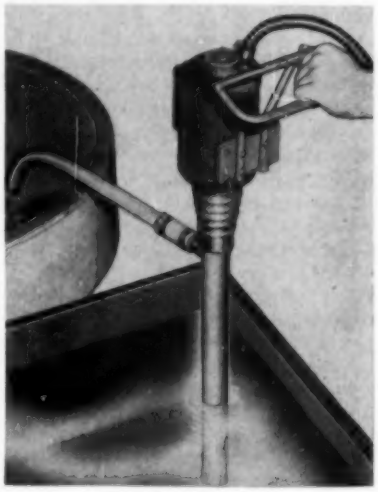
There on our cover you can find the basic building blocks (the atoms) of our industries and in the background every metal we use. These last are only the atomic symbols, but since all of the cover is symbolic in any case, we feel we might be forgiven this.

Richard Huntley must again be applauded for his expert use of the intricate arts of printing production. The AES must be given a vote of thanks for its insistence on the high quality of PLATING throughout the year. You, our readers, must accept the deep gratitude we feel for your honest criticisms and the many letters you have sent us throughout the year.

Let this Puckish cover say, "Happy Holiday Season—To Every Man Engaged in the Metal Finishing Industries."

Adoria

EQUIPMENT & SUPPLIES



Spurt-free Acid Pump

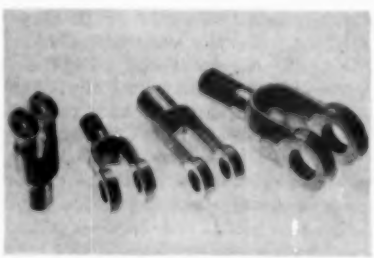
E—1233. Centri-F Acid Pump—Thompson Mfg. Co. has announced a new Centri-F Pump which was primarily designed to transfer acids from small, open, plating and storage tanks. The 1¾ inch od of the intake pipe is such that it may also be easily inserted through the openings of standard carboys and drums.

The pump is portable, self-priming, and is powered by a ¼ hp, 115 v, 60 cycle, single phase, 3450 rpm, specially designed motor which delivers a smooth, spurt-free flow of approximately 6 gal/min.

The pump is individually constructed of materials suitable for use with the actual acid to be handled, and is shipped complete with cord, plug, and enclosed switch.

E—1234. Tapped and Threaded Yokes—Tapped yokes in a wide range of sizes both plain and threaded are announced as an addition to their line of mass-produced standard parts for tool, die, jig and fixtures by Jergens Tool Specialty Co., Cleveland, Ohio.

Used in a variety of applications for attaching to threaded or tapped linkage, the new yokes are forged with holes reamed and faced-off parallel inside and outside of the yoke-ends.



Forged Yokes

CITY STATE

DETROIT 11, MICHIGAN

HULL CELLS AND ACCESSORIES • NO-CRO-MIST" • CURRENTESTER • CHROMETER • ROHCO NO-FLASH

AIRCRAFT BLACK CADMIUM DIP

On Christmas Eve we love to sing,

Of old-fashioned friendships which make the

heart ring!

And may the New Year with its promising days,

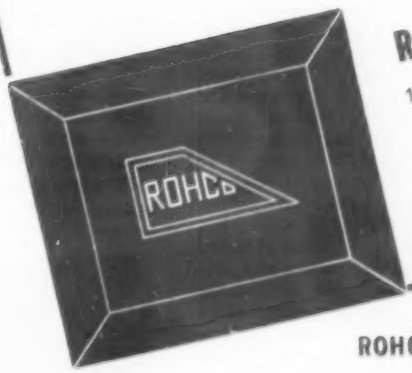
Bring blessings to you in dozens of ways!

"Merry Christmas and a Happy New Year"

R. O. HULL COMPANY, INC.

1300 Parsons Court Rocky River 16, Ohio

"THE HULL CELL TEST MAKES PLATING BEST"



ROHCO 20XL CADMIUM BRIGHTENER • ZINC PURIFIER

HANGING HULL CELL • ROHCO 303 STILL ZINC BRIGHTENER • ROHCO 100 BARREL ZINC BRIGHTENER

PERMA-BRITE S STILL ZINC BRIGHTENER • PERMA-BRITE B BARREL ZINC BRIGHTENER • RINS-AID

EQUIPMENT & SUPPLIES

E—1235. Complete Line of "Red Tang" Files—Simonds Saw and Steel Company, Fitchburg, Mass., announces a complete line of "Red Tang" Files including American Pattern Files and Rasps, "American-Swiss" Swiss Pattern Files, "Vixen" Milled Curved-Tooth Files and Holders, and Rotary Files and Burrs (High Speed Steel and Carbide).

With this expanded, complete line of files, Simonds can now supply a file for every need regardless of application: machine shop operations, saw filing, die making, precision instrument manufacture, automotive and aircraft production, pattern making, foundries, railroads and shipyards, garages, auto body repairing and for special applications.

E—1236. Scrubber Removes Low Micron Dust, Fumes and Odors From Exhaust Gases—A special new dust control unit has been designed that removes microscopic solids, fumes and odors from exhaust gases at 99 per cent efficiency. It can be used anywhere impurities are encountered of extremely low and even sub-micron size particles.

Efficiency up to 99 per cent has been obtained in test situations with dust loadings at five grains per cubic feet and 70 per cent of the material below five-micron particle size.

The new unit, known as the Type A Hydro Precipitator Scrubber, is a development of The Johnson-March Corporation, Philadelphia. It collects dust by hydro-compressing exhaust gases through a system of multiple tubes into a water chamber. This produces a highly efficient scrubbing action. The violent water agitation set up causes secondary pressure turbulence and additional scrubbing action in the tube chamber.

99 Per Cent Efficient

The scrubber comes in 15 sizes for capacities ranging between 500 cfm and 40,000 cfm. Sludge can be removed constantly or intermittently by manual, hydraulic or mechanical means.

The Type A scrubber is designed for durability, with basic variations for size change It consists essentially of a rectangular shaped housing containing a plenum chamber, a multiple-tube section, water tank underneath the housing, a dewatering filter and an exhaust fan mounted on top of the housing.

E—1237. Gold Lenses for Inspection Wear—Interchangeable gold, methyl methacrylate lenses, recommended for inspection wear, are now available in Watchemoket "feather-light" Tuc-Away Safety Spectacle frames. Under close overhead lights, the gold lenses reduce eye fatigue and eye strain by softening glare and absorbing almost 100 per cent of all harmful ultra-violet rays. At the same time, they make objects clearer by improving the contrast between black and white. The lenses are optically perfect, made of 0.080 inch thick shatterproof methacrylate and provide excellent protection against flying particles. Eye Saver methacrylate lenses resist damage from most chemicals, acid or alkaline and will not pit from grinding or welding sparks.

Au Coated

HOW TO BUY RUBBER LINING

FOR LONG LASTING PROTECTION OF EQUIPMENT AND PROCESSES

For pickling and metal plating you need positive protection against corrosive effect of acids on your equipment . . . and the contamination of solutions used in your operations. Linings of thick, non-porous layers of rubber, rather than a mere film or coating, offer the kind of lasting protection that lengthens the service life of your tanks and other process equipment. Rubber tank linings should be compounded to withstand changes in temperature and present a resilient, non-breakable surface at all times.

Look for rubber linings that provide an inseparable bond of rubber to metal. Where linings are bonded to metal so securely they *can't* separate, you are assured permanent protection from corrosion and contamination as well as stray plating currents.

Entrust your equipment to the company with facilities to efficiently handle any equipment lining job, regardless of size or complexity . . . and the reputation of years of leadership in rubber lining technique . . . specify "Manhattan Rubber."

MANHATTAN RUBBER LININGS

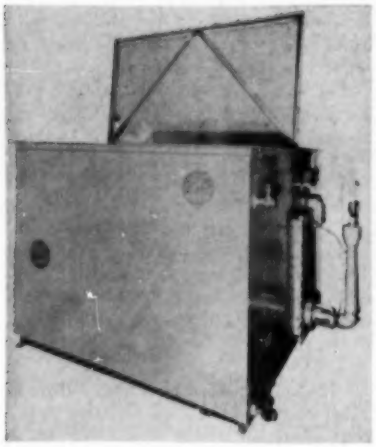
Whether your lining problem is simple or complex, Manhattan Rubber Linings assure you lasting protection against deterioration of equipment and contamination of the solutions used in your operations. Manhattan Rubber Linings are made from thick, calendered sheets of natural or synthetic rubber . . . compounded to expand and contract with the metal without cracking and eliminate stray plating currents. Tests prove they cannot be separated from the metal without breaking. To make certain your equipment has perfect bonded protection, every Manhattan Lined Tank is tested under high voltage to detect any possible imperfections. Let an R/M lining engineer show you why Manhattan Rubber Linings are the best you can get . . . contact the R/M rubber lining facilities nearest your plant. RM 524

RUBBER LINING PLANTS AT PASSAIC, N. J.—NORTH CHARLESTON, S. C.

MANHATTAN RUBBER DIVISION — PASSAIC, NEW JERSEY

RAYBESTOS-MANHATTAN, INC.

Manufacturers of Mechanical Rubber Products • Rubber Covered Equipment • Radiator Hose Fan Belts • Brake Linings & Blocks • Clutch Facings • Packings • Asbestos Textiles Engineered Plastic, and Sintered Metal Products • Abrasive & Diamond Wheels • Bowling Balls



1000 lb Capacity

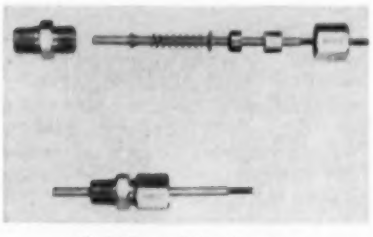
E—1238. Automatic Degreaser for Hot or Cold Operation—A new, mechanically agitated degreaser, designated as Model PW1000, has been announced by The Kleer-Flo Co., N. Y. This new model with a capacity of 1000 lbs is designed for production cleaning from small parts to large dies.

The work platform of Model PW1000 (60 inches x 45 inches) moves up and down through the cleaning compound at the rate of 38 complete strokes per minute. This powerful action forces the cleaning compound into all crevices and tapped holes, thoroughly flushing out dirt, grease and metal chips.

E—1239. Thermocouples Announcement has just been made of the new, exclusive Conax Pressure Sealing Spring Loaded Thermocouples by the Conax Corporation, Buffalo, N. Y.

These compact, self-contained Conax Pressure Sealing Spring Loaded Thermocouples insure positive contact for high thermal conductivity. They are used for checking bearing temperatures, surface temperatures, injection molding machine temperatures and other similar applications.

Fast response is insured by the small, 1/8 inch dimaeter, two wire pyod construction. The sealing method eliminates entry of foreign matter into the system as well as sealing internal vacuum or pressure to 200 psi. Fittings and tubes are made of Type 303 stainless steel. Tubes are available in lengths to meet particular application requirements.



High Thermal Conductivity

Conax Pressure Sealing Spring Loaded Thermocouples are available with either Iron-Constantan or Copper-Constantan calibrations. Standard pipe thread connection is 1/8 inch ips.

E—1240. Mobile Lab Glassware Washer—A new mobile laboratory glassware washer, reducing labor costs and eliminating glassware breakage, is announced by Labline, Inc., Chicago, Ill.

"Power-Scrub" has 4 power brushes; cleans all types of glassware 4 times as fast with greater speed and safety than hand work. Motor-driven, interchangeable Nylon brushes have rigid spindles, eliminating glassware breakage, and promoting safety.

Mobile Unit is a self-contained cabinet with stainless steel sink bowl 16 inches x 14 inches x 14 inches deep, and rubber-tired casters. Can be placed at any spot in the lab. Vertical spiral brushes are always submerged during cleaning, giving greater cleaning effect. Special winding of bristles continually forces fresh cleaner into glassware.

A selection of 9 Nylon brushes will cover all types of glassware. Brushes have quick-acting tapered chucks and can be changed in a few seconds without draining sink.

A portable unit is also available, designed to set directly into any sink. Can be removed when washing is over.

"Power-Scrub" cleaner, for use with "Power-Scrub" washer, is specially compounded without any soaps. It does not foam, froth or scum. Leaves glassware sparkling clean.

SEYMOUR

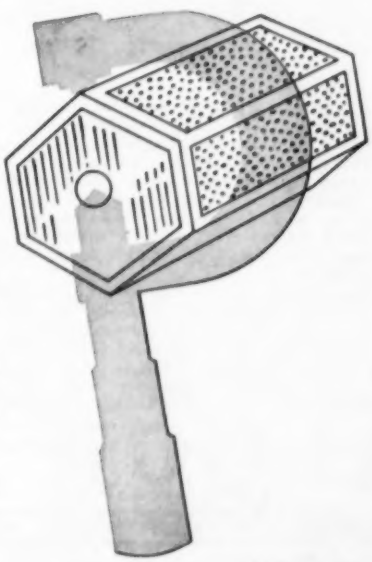
BRIGHT NICKEL

FOR PLATING TO SPECIFIC THICKNESSES

Seymour "NC" and "CK" Bright Nickel processes in a warm plating bath permits specification barrel nickel plating to any desired deposit from .0002" to .0010" at speeds four to six times faster than a cold solution.

Seymour Barrel Nickel Brightener solutions are also available for cold plating baths where decorative deposits of about .0001" maximum are required.

Simple to maintain and easy to control, Seymour brighteners permit chromium plating without prior buffing or wiping.



THE SEYMOUR MANUFACTURING CO.
SEYMOUR, CONN.

Nonferrous Alloys Since 1878

Total Direct Flow

E—1241. Flowmeters of Direct Flow Design—Two new indicating flowmeters that feature direct flow through the meter chamber have been announced by the Instruments Division of Scully-Jones and Company, Chicago, Ill.

Direct flow design keeps the housing clean, and flexing of the vane in operation prevents any accumulation of scale or sludge. These new flowmeters are in the total flow class so flow eddies due to pipe fittings have little or no effect on accuracy.

The basic design improvement made in these instruments is the flexible vane riveted to the body at one end, leaving the other end free to traverse an arc equal in length to the calibrated scale. A horseshoe section of the flexible vane permits the necessary motion under flow, safely within the elastic limits of the vane. This design eliminates completely delicate component parts such as pivots, bearings, bellows, diaphragms, glass tubes, floats, etc.

E—1242. Aluminum Putty—Devcon F, which consists of approximately 80 per cent aluminum and 20 per cent plastic, is now being used by several automotive companies, machine shops, foundries and other concerns for filling very large and small holes in aluminum and steel castings, to cover holes which have been drilled incorrectly, and to build up worn sections. The machined surface has an appearance almost identical to aluminum or polished steel. This new material is as easy to use as modeling clay. A large mass can be applied to a vertical surface and will not run or sag. No special skill is required.

Devcon F has excellent adherence to aluminum and steel, and also to bronze, brass, and cast iron. It will bond to a flat surface and can be machined to a feather edge. It is not necessary to undercut the metal or treat it in any special way. No volatile solvents or thinners are used; therefore the Devcon will not shrink or pull away during hardening.

A special hardening agent is supplied with every Devcon container. The hardener is simply added to the Devcon and mixed with a screwdriver or a nail. Two measuring spoons are included for measuring out small quantities.

This new product is manufactured by the Chemical Development Corporation of Danvers, Mass.

Devcon F is packed in one pound, four pound, and fifteen pound containers, and has practically unlimited storage life. A trial package suitable for the average machine shop or foundry consists of four one pound cans of Devcon F, four small jars containing the exact amount of hardener for each container, two aluminum spoons for measuring out small quantities, and complete instructions for use.

E—1243. Redesigned Centrifugal Pump—Greater volumetric capacity and materially reduced net positive suction head for its Centri-Chem® Type 20 alloy centrifugal pump has been achieved by Eco Engineering Company, Newark, N. J., by increasing the suction port size from ¾ inch to 1 inch pipe thread while retaining the ¾ inch discharge port.

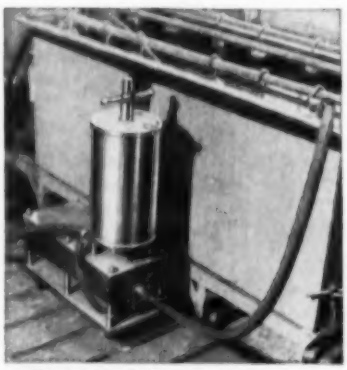
The Centri-Chem pump is constructed of Type 20 alloy throughout and features

LOOK

No Rejects

NO pitting, spotting, or reworking . . . . . .

Impurities—primary cause of pitting, spotting, rejected finished work—are positively eliminated by the Alsop "Sealed-Disc" Filter. That's because they're designed for Platers—to meet plating room requirements. That's why they're compact, portable—smaller than conventional filters—save valuable space—yet capable of handling equal volumes of solutions.
Simplicity of design cuts operating time and labor—means savings for you. Check its many additional proved performance features and know why more platers depend on "Sealed-Disc" Filters. Ask your regular plating supplier—or write for details.

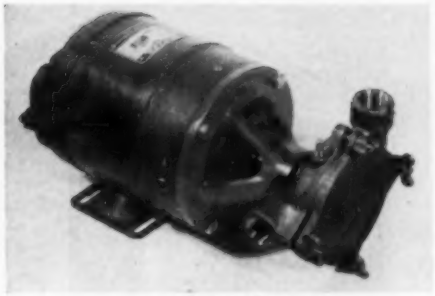


"Sealed-Disc" Filters remove more impurities with less effort and in less time. Use it on your acid dips, electro cleaners, and solvents too.

ALSOP Positive Filtration

ENGINEERING CORPORATION FIRST STEP IN CUTTING COSTS

1012 FINE STREET • MILLDALE, CONNECTICUT



Easy to Service

a Teflon-ceramic shaft seal for optimum corrosion resistance. Pumps are available with closed or semi-open impellers and can be opened for cleaning, without removal from line, by removing four wing nuts and the face plates. Face plates are available in Type 20 alloy or Pyrex glass, the latter being useful when it is desirable to observe the medium being pumped.

Suction and discharge piping need not be disturbed when pump is serviced or when the shaft seal is replaced. Precision cast and dynamically balanced impellers, together with minimum shaft overhang, assure absence of vibration and long bearing and shaft seal life.

E—1244. Compact Model Laboratory Degreaser—In every respect a duplicate of large standard commercial degreasers, the new Model U-18 compact-size degreaser for vapor-spray degreasing of precision parts and for laboratory usage is available from Randall Manufacturing Co., makers of Ramco Degreasers.

This Ramco Unit U-18 is constructed of all welded stainless steel, with copper condensation coils and interplumbing. It has a stainless steel immersion heater, with thermostatic liquid heat control. Copper cooling coils maintain positive vapor level with needle valve water inlet control.

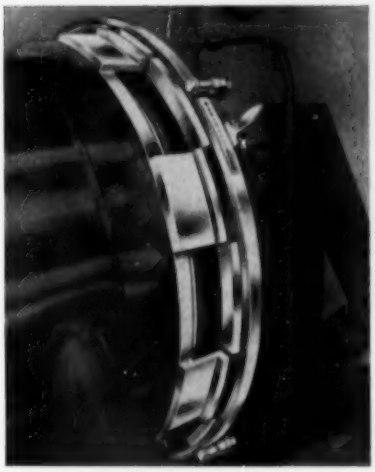
An engineered water separator storage tank holds entire contents of main sump. The Ramco U-18 degreaser has complete solvent recovery system—by operating overflow valve, machine automatically distills contaminated solvent and is ready for operation again.

Compact Degreaser

E—1245. Speed Lock Cover—Sparkler Manufacturing Company announces that its new Passalaqua Speed Lock Cover will be standard equipment on all Model MCR retractable tank vertical plate filters.

The new, easy-to-operate safety cover is approved by ASME and has proven particularly useful for pressure vessels that require frequent opening. The cover is locked by a series of visible bow-shaped lugs mounted on a third ring. The lugs are in direct rectangular shear. Even if one lug fails, the cover remains locked because the stress divides itself equally among the remaining lugs, which have a high safety factor.

The third ring has a locking arrangement that locks in both the open and closed position. Engaging all holding devices is simultaneous and foolproof. The ring floats in roller bearings and its



Filter Lock Cover

SAFE for all baths

With Unichrome Coating 218X, plating and anodizing racks are fitted for long use. Leading bright nickel producers have approved this green plastisol because of its chemical inertness. Well known plants are cutting costs with it. It's one of the most widely used coatings in the industry.

Justly so. Coating 218X resists severest plating and cleaning baths, even vapor degreasing cycles. It rinses freely, sticks tight to contacts, won't chip, crack or blister.

Write for further information.

UNICHROME trade mark

materials · processes · equipment

for better plating at less cost

UNITED CHROMIUM DIVISION
METAL & THERMIT CORPORATION

100 East 42nd Street, New York 17, N. Y.
Detroit 20, Mich. • Waterbury 20, Conn.
E. Chicago, Ind. • El Segundo, Calif.
In Canada: United Chromium Limited, Toronto 1, Ont.

FOR FURTHER INFORMATION, USE READER SERVICE CARD; INDICATE A 1236.

NOW Low Prices on G-E Automatic Make "Automatic Savings" Available to

TRIM ALLOYS, INC., OF BOSTON SHOWS HOW G-E AUTOMATIC POWER SUPPLIES SAVE LABOR, SPOILAGE, AND MAINTENANCE.

Lower prices on General Electric automatic plating rectifiers now let you take a big step toward complete automation . . . at low cost.

Besides bringing within your reach the savings of automation, G-E automatic plating power supplies are designed to assure you of uniform plating.

The Trim Alloys, Inc., installation was engineered by The Chemical Corp., Springfield, Mass.

HERE IS THE REPORT OF TRIM ALLOYS, INC., which uses G-E automatic plating power supplies for anodizing aluminum extrusions: "Ours is a high quality process, yet we don't want to waste time, manpower, or materials. In order to maintain our high standards with manual control, we would need a man on the controls all the time. With G-E automatic control, however, we free our operators for other work . . . and get much better control, too. We simply push the start button and the unit seeks its own best setting for that particular load, shutting itself off at precisely the same interval each cycle."

Progress Is Our Most Important Product

GENERAL ELECTRIC

FOR FURTHER INFORMATION, USE READER SERVICE CARD; INDICATE A 1237

COMPARE THE PRICES OF THESE LARGER UNITS

24-volt, 4000-ampere unit with automatic anodizing control—$8860*

9-volt, 10,000-ampere unit with automatic voltage control—$10,080*

24-volt, 3000-ampere unit with automatic anodizing control and sealed, oil-cooled stacks———$8380*

* *Manufacturer's suggested user price.*

Plating Rectifiers Every Plating Shop

AN INCREASING NUMBER OF PLATING SHOPS are discovering that G-E plating power supplies with automatic control cut plating costs in three big areas:

1) LABOR—No one needs to stand by the controls to adjust for changes in the tank load. Plating operators can be freed for other operations.

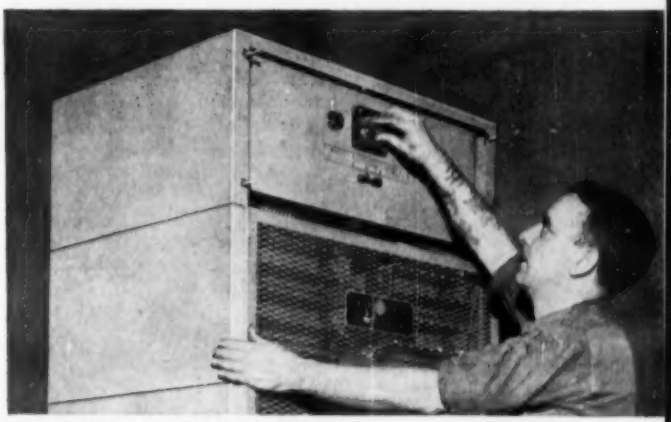
2) SPOILAGE—Spoilage is reduced, since deposition is kept uniform by the constant current or voltage. This reduction in spoilage means fewer rejects . . . less re-working expense.

3) MAINTENANCE—Maintenance is kept low, because both the G-E automatic control and rectifier are mechanically static. Except for the cooling fan, there are no moving parts.

BEFORE YOU BUY ANY PLATING RECTIFIER, check G.E. for the three types of automatic regulation available: (1) voltage, (2) current, and (3) anodizing.

For full details, contact your G-E plating agent, or send in the coupon.

UNIFORMLY ANODIZED EXTRUSIONS are removed from the tank at Trim Alloys, Inc. Automatic control, assures uniform, high-quality anodizing every time, resulting in fewer rejects.



THE DESIRED ANODIZING SEQUENCE is set up by the operator at the rectifier control panel. Once set, the anodizing sequence is completely automatic, requiring no further adjustment.

THE REMOTE-CONTROL STATION is conveniently located within easy reach of the operator right at the anodizing tank.

Section D463-13, General Electric Co., Schenectady 5, N. Y.

I would like to receive additional information on how I can save money when I plate with G-E automatic plating power supplies. Please send me bulletin GEC-970A.

NAME .....

COMPANY .....

ADDRESS .....

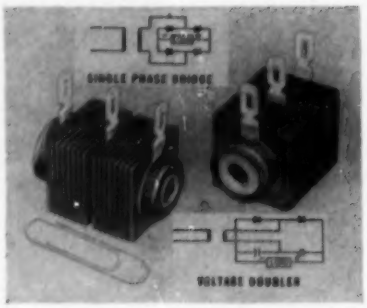
CITY & STATE .....

EQUIPMENT & SUPPLIES

lugs are not under shear until internal pressure in the tank is built up. Even in a large diameter tank, the ring travels through an arc of only 15 to 20 degrees. This enables the cover to be opened in seconds, without the use of hand tools or power devices.

An O-ring sealing gasket is incorporated which gives a self-seal that becomes tighter in direct proportion to the increase in internal pressure.

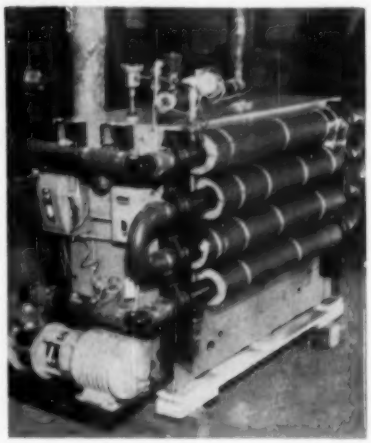
E—1246. Dual Purpose Selenium Rectifier—A new, small, compact, and inexpensive dual purpose selenium rectifier has been developed by International Rectifier Corporation. Basically, this unit, type 60-9150 is a voltage doubler stack, therefore, one of these units can be used as a doubler and two units can be connected as a single phase full wave bridge. Type 60-9150 is ideal for operating equipment in dental offices and other professional and commercial offices where hum is objectionable due to the normal operation of a-c relays.



Thumbnail Rectifiers

Two type 60-9150 connected in a single phase full wave bridge circuit will deliver approximately 180 volts d-c at 0.10 amperes for an rms voltage input of 230 volts. As a voltage doubler, this unit will deliver 50 ma. connected to a maximum a-c input of 175 volts rms. Used with sufficient capacitance, an output of 350 volts d-c can be obtained.

E—1247. Refrigeration Unit—Carl Buck & Associates, N. J., offer a complete refrigeration unit for cooling sulfuric acid anodizing solution. Pump is of Camac Furacam plastic and heat transfer tubes of Karbate. These units are available in all sizes to do any solution cooling job.


Cool

Materials of construction include Karbate, plastics, steel and stainless to provide a complete pump and exchanger unit of proper materials to resist attack by any solution. Unit can be furnished complete with necessary controls to hold solutions at any desired temperature.

E—1248. Micrometer—A distinctly new and differently designed Indicating Bench Micrometer with non-rotating spindle is introduced by the George Scherr Company. Ideal for maintaining close limits on small work, it provides an excellent aid for fine small-parts-measurements such as instruments, parts, wires, screw machine parts, etc., for the toolmaking, the instrument making and the electronic field. Spindle and anvil have bores for holding different shapes of measuring spindles.

It measures by 0.0001 inches directly from the dull chrome finished oversize micrometer thimble, which is 1¾ inch in diameter and guarantees error-less reading without aid of magnifier. Its Indicating head is graduated in 0.00005 inch with plus and minus 0.002 inch range, resulting in a total range of 0.004 inch.

As a comparator it may be set without additional standards. An ingenious cable release retracts anvil instantly for rapid repeat measurements. Zero adjustment is accomplished by means of fine adjustment screw outside of housing. Two tolerance hands are quickly adjusted to any decided plus and minus tolerance.

America looks to . . . Hammond
for
FINISHING
and
DEBURRING
"KNOW-HOW"
The experience gained in over 70 years of machinery building has provided us with a big bank of "Know How."
This knowledge is drawn upon and added to every day. Our business is to share it with you to bring down high finishing costs. Many users of Hammond Automatics have found more efficient means of finishing by drawing on our bank of "Know How."
The Rotary Automatic illustrated represents one of our many types and sizes of automatic finishing machines for either continuous rotation or indexing. The head and stand units shown are a part of a large "family" which range in type and size up to 20 HP.
SEND SAMPLES and we will show you how much you can speed up production and cut costs.
Hammond Machinery Builders INC.
1613 DOUGLAS AVE. • KALAMAZOO, MICH.

47 sq in of Surface

E—1249. Seam-Free Work Surface gloves—As a direct result of the enthusiastic reception accorded last year's introduction of its improved Stanflex work glove, the Pioneer Rubber Company, Willard, Ohio, has added two new models to the Stanflex line: the palm-coated knit wrist type, and a 10-inch band top style, also palm coated. Both gloves have been carefully designed to allow more than 47 square inches of seam-free work surface, which means that seams are completely eliminated from abrasion points. The specially compounded plastic coating offers a non-slip satin finish which actually outwears leather gloves.

E—1250. Spray-On, Strips-Off Protective Coating—BoothGuard, a new spray-on, strip-off protective coating for spray booths and spray areas, has been developed by Guard Coatings Corp. of Long Island City. The water-type coating is sprayed on the walls and ceilings of the booth, where it quickly dries and forms a thin white film. When paint overspray accumulates, BoothGuard is easily stripped off the walls in large sheets, taking the overspray with it and leaving an absolutely clean booth in minutes.

BoothGuard water-type coating is non-inflammable in liquid form, which eliminates the need for special storage areas and high insurance risks. Only one coat is necessary to cover an area completely with what the manufacturer states is the whitest, best reflecting coating on the market. This coating will not feather or web when sprayed on, nor tear or shred in small pieces when stripped off.

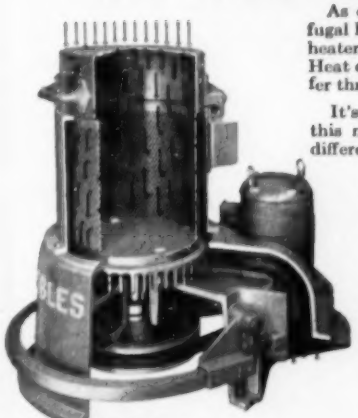
E—1251. Quick, One-Dip Brightening Treatment.—The Chemical Corp., Springfield, Mass., has announced the addition of Luster-On M to its line. Luster-On M is a new, quick one dip brightening treatment for zinc which can be used in very dilute 2 per cent solution to give a bright, attractive finish with good corrosion protection.

Also announced is a new Kemsuds product, Platinum Balm—an Antiseptic Powdered Hand Soap. The new soap contains a graded, safe all vegetable scrubber particularly formulated for women in industry. It also has a very high percentage of Beaded Ivory soap and a large quantity of emollient which offers protection from chapping in cold weather leaving the skin soft and smooth. In addition, it contains lanolin and G-11 (Hexachlorophene). G-11 helps protect both men and women workers against skin infection and helps prevent contamination of the materials they handle.

E—1252. Inorganic Coating to "Cold Galvanize"—Plant maintenance painters can now give existing steel structures the same protection that galvanizing affords, plus salt water resistance, with an unusual protective coating called Dimetcote. Not a paint, although applied with either brush or spray, Dimetcote is a 100 per cent inorganic, metallic zinc coating that contains no oils or resins. Only one coat is required for most applications. The material cost is less than 6 cents per square foot.

Not only is Dimetcote unusually resistant to severe weathering and abrasion, but it is unaffected by solvents and petroleum products. The coating has been proven in use in a wide variety of industrial installations such as structural steel, floating roof tanks, barges, marine drilling towers, ship decks and dam gates. A unique feature of the coating is that the film cathodically inhibits corrosion of contiguous areas of bare steel. According to the manufacturer, when Dimetcote is applied, a reaction takes place at the surface which produces chemical bonding as well as physical adhesion, so that it is almost impossible to find the interface.

FOR LOWER DRYING COSTS!



As optional equipment with any Nobles Centrifugal Dryer, you may have efficient steam or electric heaters safely and compactly mounted in the cover. Heat doesn't come from an auxiliary unit and transfer through pipes . . . it saves space, saves heat.

It's only one of many features you'll like about this machine of advanced design. It's completely different in principle. The old way was to *blow* air down at the parts. A powerful suction fan *draws* the air from the bottom of the modern Nobles Dryer. Fresh air rushes in from the top to fill the vacuum, is drawn evenly through the entire contents and exhausted at the bottom.

You'll like its extra weight, its smoothness, its freedom from vibration. As one user put it, "Certainly it depreciates less and requires less maintenance than any competitive product."

In the interest of lower drying costs, write for more information today!

NOBLES ENGINEERING & MANUFACTURING CO.

Write Today for the FREE NOBLES-DRYER BROCHURE

FOR FURTHER INFORMATION, USE READER SERVICE CARD; INDICATE A 1240.

EQUIPMENT & SUPPLIES

E—1253. ESBEC Zinc Compounds for Barrel Finishing.—Two new barrel finishing compounds which the makers state will produce phenomenal results on zinc die castings have been announced by Morris S. Shipley, President of ESBEC Barrel Finishing Corporation, Byram, Conn. Esbec No. 655 is a mild abrasive compound which produces ultra smooth surfaces in surprisingly short cycles and rinses completely at the end of the cut down run. This is followed by a short burnishing cycle in Esbec No. 205 burnishing compound which the makers state will produce ultra high lustre on all types of zinc alloys.

In many cases, where parts are being prepared for plating, ball burnishing can be eliminated by merely lengthening the honing cycle with Esbec No. 205.

E—1254. Spray Valve and Versatile Reactivator—A completely new type of spray valve has been designed by the Graver Water Conditioning Co., New York, for use with its deaerating heaters and hot process softeners. The valve has resulted in new heights of efficiency for these units. The main feature of the valve, developed after intensive research, is a parabolic plug of special construction which provides a constant flow angle under all conditions. By means of this plug an unvarying, even spray pattern is obtained with pressures and flow rates ranging from 3–150 per cent of rating.

The valve is made of corrosion-resistant stainless steel, is nonsticking, and requires no maintenance. Its reliability having been proven in exhaustive pilot and actual plant tests, is now an exclusive feature in all Graver deaerating heaters and hot process softeners.

FORMAX

the Perfect Combination

FROM START TO FINISH

ZIPPO CLOTH BUFFS

These famous long-wearing buffs run cool under all buffing conditions. High count bias-cut cloth is assembled on ventilated steel centers. Each section is perfectly balanced and faced—requires no raking.

BUFFING COMPOUNDS

Formax produces a complete line of buffing compounds in bar, tube and liquid form.

Our extensive manufacturing, laboratory and testing facilities are at your disposal.

ZIPPO SISAL BUFFS

You have a pleasant surprise coming if you haven't tried the new Zippo bias-type sisal buff. It was specifically developed for steel buffing—to blend polishing grit lines—to cut down stainless steel—and bring up a bright lustre.

Other Formax products include the well-known C-20 Flexible Contact Wheels and F-26 Abrasive Belt Grease Stick.

Descriptive Catalogs Sent on Request

FORMAX MFG. CORP.

DETROIT 7, MICHIGAN

"THE FOUR McALEERS"

E—1255. New Versatility for Graver Reactivator—A method of clarifying, simultaneously, water containing both settleable and nonsettleable particles is is also being offered. This has been accomplished by the addition of a surface skimmer to Graver's solids-contact clarifier, the Reactivator.®

By means of this addition the Reactivator can now remove, in one operation, both those particles and precipitates with a natural tendency to settle and those whose natural buoyancy causes them to rise to the surface. It is most effective in treating white waters from pulp and paper mills and in removing oil from water which also contains settleable particles.

E—1256. Special Process for Armoring Pipe—IMPERVITE impervious graphite pipe and fittings can be armored by a special process which uses strong, shock absorbing Fiberglass cloth, impregnated with a chemical and heat resistant thermosetting plastic resin.

New Armored Impervite pipe is recommended wherever greater operating safety is desired for personnel or equipment. This armor provides a substantial safety factor against breakage from exterior physical shock. It also eliminates the resulting excessive damage of most high pressure explosions. Where abnormal usage does result in a fracture, the glass-resin armor is strong enough to hold the pipe together, so that corrosive flow remains under control long enough to take corrective measures.

The application of the glass-resin armor does not change the properties of the impervious graphite material in any way.

Impervite pipe is resin impregnated graphite. It is unconditionally guaranteed against the effects of thermal shock. It is impermeable, non-contaminating and is immune to the attack of practically all corrosives except a few highly oxidizing agents. It is relatively light in weight, and is suitable for operation at pressures of 75 psi hydrostatic or 50 psi steam, and temperatures to 340° F. The glass-resin armor is applied on impervite pipe which is completely treated and ready for use as standard non-armored pipe. The fiberglass cloth is saturated with a chemically resistant thermosetting plastic, and tightly wound around the pipe. It is then cycle-baked to form a tough one-piece jacket, positively bonded to the pipe.

E—1257 Pulmosan's Secureye Shield: Light weight and comfortable, it provides a larger area of protection than is usually permitted by the average type goggle. Rigid and tough construction affords full eye protection against flying particles. Exclusive replaceable foam rubber sweatband. Available in transparent clear or transparent green non-shattering Lumarith.

Tailored to your Needs...

Your problem is individual. Your circumstances require unique study only for you. Your success depends on the individualized specialization devoted to your problems.

We pride ourselves at Richardson-Allen in always assuming your problems on an individual basis, backed up with constant study, complete engineering facilities and years of experience devoted solely to the manufacture of the finest rectifiers — selenium, germanium, etc. Write now for complete literature.

RICHARDSON ⚡ ALLEN
CORPORATION
DEPENDABLE RECTIFIER SPECIALISTS

a manufacturing affiliate of **WESLEY BLOCK AND CO.**, 39-15 MAIN STREET, FLUSHING, N.Y.
IN CANADA: Richardson-Allen of Canada, Ltd., 370 Victoria St., Toronto, Canada

FOR FURTHER INFORMATION, USE READER SERVICE CARD; INDICATE A 1242.

EQUIPMENT & SUPPLIES

E—1258. Armored Purge Meter—An armored purge meter—the first of its kind—has been announced by Fischer & Porter Company, Hatboro, Pa., manufacturers of complete process instrumentation.

Featuring all-metal, rugged construction—1500 psi ASA pressure rating—combined with low cost, the new meter gives safe, inexpensive metering of any purge fluid.

The meter is suitable for use in any chemical or processing installation where purging is required. It was field-tested successfully in purge applications in the refinery for which it was specifically designed.

Designated as the Figure 245 Armored Purge Meter, it uses a magnet and follower to indicate flow rate. A unique feature is the easy means of restoring operation of the meter should the magnet ever be lost due to a violent surge in the line. If this happens the follower will drop below the zero line on the scale.

To restore the magnetic bond, the operator merely closes the head valve momentarily, and, as the float settles to approximately 10 per cent of flow, the magnetic attraction is strong enough to attract the magnet from its resting position and once again register true flow.

E—1259. Platinum Sensing Element—Platinum resistance temperature detectors that are small and have high speed response now are offered for use in precision temperature measuring and control systems.

A product of Fielden Instrument Division of Robertshaw-Fulton Controls Company, the unusually flexible detectors may be applied to temperature ranges from 330° F to 1380° F.

Platinum sensing elements are hermetically sealed in either $\frac{1}{32}$ inch diameter pyrex or $\frac{1}{16}$ inch diameter ceramic housings, and are especially useful where limitations of space prevent use of conventional resistance detector units. Because of their small size and use of the precious metal, the sensing elements are capable of extremely high speed response.

For use in pyrogen testing or general laboratory work, the detectors are mounted in a $\frac{1}{8}$ inch smooth stainless steel case with all leads protected by pliable rubber tubing. The platinum element is accurate within ± 0.6 per cent.

E—1260. Flooring—A new method of protecting concrete, bituminous, mastic or other industrial floors against acids, water, and cutting oil damage is announced by Maintenance Inc., Wooster, Ohio.

It consists simply of applying a seal coat of liquid Jennite J-16 over the exposed floors, according to the manufacturer. This can be accomplished by either brush, spray or squeegee at the rate of one gal/100 sq ft. While two coats are said to give adequate protection, three applications are recommended in extreme cases.

The final coat should be allowed to cure eight hours before use. If an abrasive surface is desired, this can be obtained by incorporation of silica sand into the top coat. J-16 dries to an attractive velvety gray-black.

J-16 is claimed to withstand the attacks of most chemicals used in industry. It is completely impervious to water and resistant to petroleum derivatives including gasoline as well as fats and sugar, gases and fumes. In addition, it is spark proof and easy to clean.

Because it is not affected by elements of weather, J-16 chemical resistant floor coating can be extended outside onto loading docks, driveways, etc. Also, it is said to stop dusting nuisance of concrete and make all floors easier to clean.

E—1261. Techni Timers for Short Cycle Electroplating—Improved new models of the Techni Timer for precision timing of short cycle precious metal electroplating are announced by the originators, Technic Inc. Now streamlined, the automatic device is described as "taking the guesswork and human error out of short cycle electroplating."

Techni Timer does its precision work without interruption of current. It starts timing automatically when work contact is made, and automatically resets itself when work contact is broken, requiring no manual effort after the required time cycle is set. Expiration of the pre-determined time cycle is signalled by red light and buzzer.

Custom models of the Techni Timer are designed on order to meet any special requirements for short cycle precious metal electroplating. Standard Techni Timers immediately available from stock include 0–1 minute models with amperage load 8–45 or 18–100; 0–3 minute models with amperage load 8–40 or 18–100 and 0–5 models with amperage load 8–40 or 18–100.

MAINTENANCE COSTS *Dip*

When you insulate with

TYGON 277

Air-Dry **RACK COATING**

This new "higher-solids-content" rack coating builds up a thickness of five mils per dip — four easy dips instead of the seven usually needed to build a safe 20 mil coat — cuts rack handling time almost in half. This higher-solids-content means a denser, less porous coating, — safer, more efficient, longer-lasting protection.

Tygon 277 requires no primer, it is self-adhering; requires no baking, it air dries quickly; requires no laborious application techniques, just dip and air-dry—that's all.

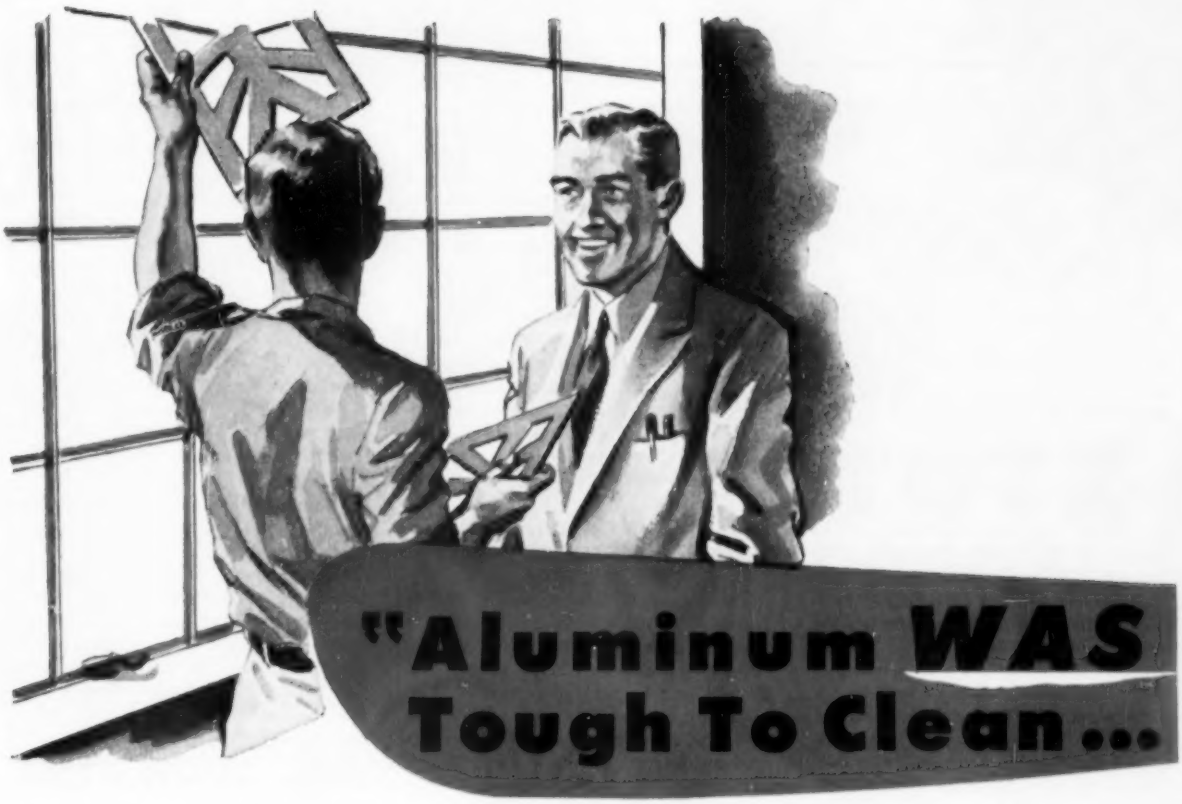
Place a trial order for a gallon today. Check it against the best you've known. You'll go Tygon 277 all the way.

Plastics and Synthetics Division

4740

U. S. STONEWARE

AKRON 9, OHIO



"Aluminum WAS Tough To Clean...

....before Northwest developed Acid Solvent Emulsion Cleaner #1."

Northwest's Acid Solvent Emulsion Cleaner No. 1 completely and quickly removes soil from aluminum parts, preparing the surface for plating, painting, anodizing, zinc chromate priming or other finishes.

Acid Solvent Emulsion Cleaner No. 1 is fast cleaning, easily rinsed and controlled, readily-emulsified, and economical. It is non-toxic, non-corrosive to equipment, and non-injurious to the metal regardless of immersion time or bath temperature.

Northwest's production-tested chemicals and "Right the first Time" recommendations will save you money. A Northwest Cleaning Specialist with the complete story on Acid Solvent Emulsion Cleaner No. 1 or any of the other great Northwest Chemicals is as close as your phone or write for descriptive literature.

Got a Problem? Let our Cleaning Specialists help you!

Remember —YOUR COST PER FINISHED ARTICLE IS THE TRUE COST OF YOUR CLEANER

NORTHWEST CHEMICAL CO.

9310 ROSELAWN DETROIT 4, MICH.

Pioneers in pH cleaning control ... serving you since '32

FOR FURTHER INFORMATION, USE READER SERVICE CARD; INDICATE A 1244.

BOOKS

Remittance must accompany order to:
American Electroplaters Society
445 Broad Street
Newark, N. J.

Deterioration of Materials—Causes and Preventive Techniques edited by Glenn A. Greathouse and Carl J. Wessel, 835 pp. $12.00 nonmembers; $10.20 members.

Almost 1500 documentary references to the scientific literature, a thorough subject index, and a foreward by Vannevar Bush, President of the Carnegie Institution of Washington and wartime Director of the Office of Scientific Research and Development.

Although there are already available many books on the preservation of specific materials such as wood, metals, textiles, paints, and so on, *Deterioration of Materials* is the first to bring under one cover a comprehensive analysis of deterioration problems and a survey of techniques presently available for preserving many of the materials in common use today. The unusual breadth of subject matter now presented was made possible through the cooperation of a great many individuals and numerous organizations, inside and outside the Federal Government, who contributed special information and latest research findings. As is the case with many Academy-Council activities, the new volume is a result of the special kind of coordination for which the National Academy of Sciences was established.

Available information on deterioration prevention falls chiefly into two categories, the first embracing the basic scientific principles concerned and the second covering applications of these principles in practice. The text of the new volume has been organized accordingly. Part I deals with the basic causative agents in materials deterioration—the climatic factors and the chemical, physical, and biological agents of deterioration as related thereto. Part II is concerned with the action of these agents on materials of various kinds and with specific methods of deterioration prevention. Part III discusses the protection of certain important assemblies of electrical, electronic, optical, and photographic equipment. And finally Part IV covers some special aspects of preservation, including dehumidification of warehouses and ships, approved methods of packaging, and the toxicological aspects of preservatives. Appended is a short analysis of the system of Government specification numbers.

How to Manage Industrial Advertising by F. W. Bartle. $3.95 nonmembers; $3.40 members.

This simple, straightforward book tells you how to find out, in dollar-and-cents figures, where your advertising is weak and where profitable. It has information on how to get double value out of your space ads; how to build an inquiry into a customer, and much more. It is easy to read and understand and is useful to the beginner as well as to the old hand.

A List of Gas Equipment for Industrial Uses. $1.00.

This fourth edition is divided into three sections. The first section lists the names and addresses of the various manufacturers of industrial gas equipment and the particular products of each company. The second edition lists alphabetically gas equipment and accessories followed by the names of the companies that makes each one of these products. The third section lists the various trade names under which products are sold and the company that makes them.

All manufacturers listed in the booklet have subscribed to the "Code of Ethics" which was formulated by the Industrial Division as a customer's guide to the best design and finest performance for equipment of this nature. The code came about because industrial gas equipment is designed and constructed largely to the individual customer's order only, so it is not possible for manufacturers to operate in accordance with the American Standards of the American Standard Association since such standards do not exist for the industrial equipment field.

Dimensional Motion Times by H. C. Geppinger, 100 pp. $4.00 nonmembers; $3.40 members.

DMT approaches the accuracy of the blueprint by relying fully on facts—dimensions—and avoiding human judgment and descriptive definitions. Since *DMT's* time values, relating to dimensions, are self-contained, complete, and final, no adjustments or build-ups by the analyst are necessary.

To clarify this practical system, the new book makes available concise terms for specifying and recording work details by motions, and for predetermining the necessary manual time of operations by motion times. The author provides a set of terms by which uniformity of analysis and measurement is assured. He also includes complete examples of application and describes how motion times are affected by engineering, methods, and material changes.

Classified Advertisements

Only "Help Wanted" and "Situations Wanted" will be accepted. Rates: $.20 per word, minimum $5.00. AES branch members and members-at-large, in good standing, are entitled to a total of three *free* advertisements in one year. Last day for inserting advertisements is the 10th of month preceding date of publication. When answering advertisements please address as follows: Box number, PLATING, 445 Broad Street, Newark 2, N. J.

POSITION WANTED—Electroplating chemist, age 24, with wife, two children. Two years undergraduate study toward chemical engineering degree completed; four years of diversified experience as analytical and plating chemist. Familiar with the compounding, analysis, solution control, and trouble-shooting of alkaline cleaning, electroplating, and non-electrolytic immersion processes for steel and type 403 stainless steel. Member of the Detroit branch, AES. Reply to Box D7, PLATING, 445 Broad St., Newark 2, N. J.

SITUATION WANTED—Graduate Chemical Engineer with sixteen years plating experience desires administrative position. Good record of cost reduction, quality improvement and technical, mechanical, productive and administrative aspects of plating. Family man, prefer small city in mid-west. Reply to Box D1, PLATING, 445 Broad St., Newark 2, N. J.

SITUATION WANTED—Sales and service representative, having been employed by the same firm for the past 15 years in the Detroit area, desires to make a change to an aggressive firm in the metal finishing industry. Reply to Box D2, PLATING, 445 Broad St., Newark 2, N. J.

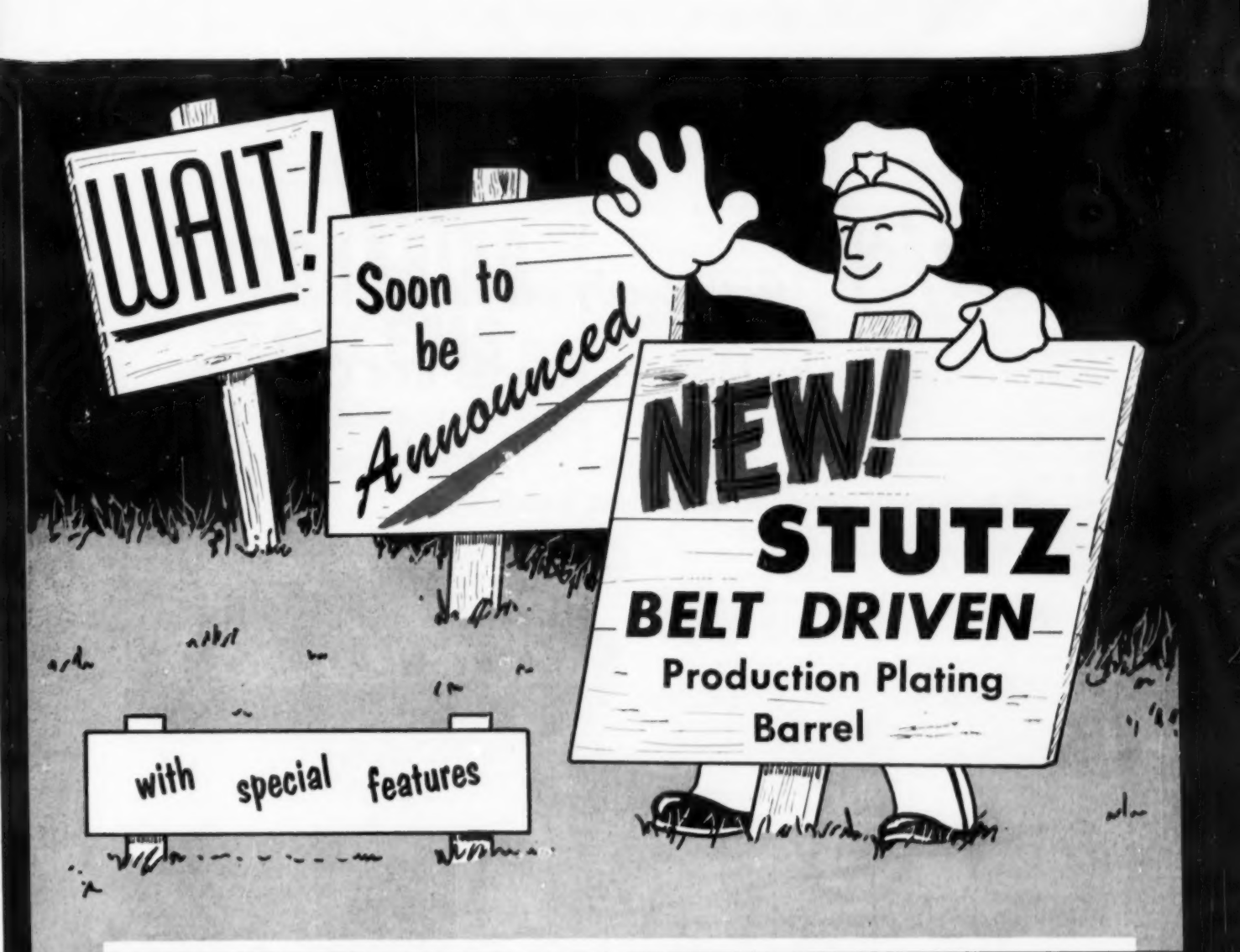
WANTED—Chemist with degree for technical control of plating laboratory and trouble shooting. Must have several years of practical experience. Location—Grand Rapids, Mich. Salary $6000–$8000. Replies held in strict confidence. Reply to Box D3, PLATING, 445 Broad St., Newark 2, N. J.

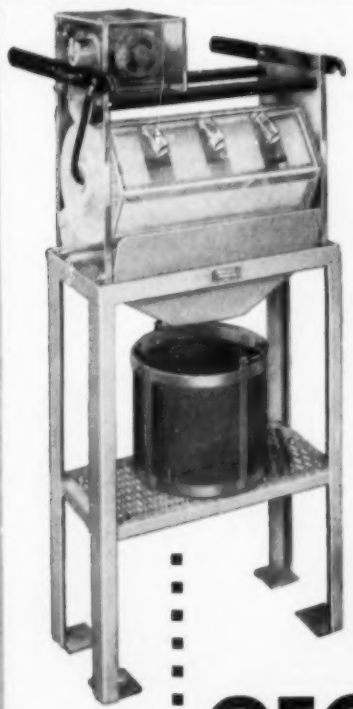
POSITION WANTED—Chemist-Electroplater, B.Sc. London. Wide and varied experience, married, 33, Polish. Arrives from England in January, desires position in research, production or control. Reply to Box D8, PLATING, 445 Broad St., Newark 2, N. J.

PLATING CHEMIST—Experimental plating and customers services in modern laboratory. Superior working conditions with top plating equipment and supply manufacturer. Excellent opportunity for advancement in long-established organization. Numerous employee benefits. Reply to Box D5, PLATING, 445 Broad St., Newark 2, N. J.

POSITION WANTED—Plant Manager (job shop) desires change to organization with greater opportunity. Technical and business education plus 16 years experience in process control, engineering and management. Proven ability in all phases of plating, polishing, painting and light assembly. Investment possible. Reply to Box D6, PLATING, 445 Broad St., Newark 2, N. J.

WANTED—Plating Supervisor. Large Midwest job shop wants man with diversified plating and production experience. Permanent job and good opportunity for advancement. Salary plus incentive bonus, also insurance and pension program. Reply in complete confidence stating age, nationality, education, experience and starting salary expected. Reply to Box D4, PLATING, 445 Broad St., Newark 2, N. J.





STUTZ

Portable Plating Barrels

★ The Stutz Portable Barrel is made in 2 standard sizes with cylinders having inside dimension of 6″ x 12″ and 8″ x 18″ I. D., and smaller upon application. Standard openings are 3/32″. Smaller or larger openings can be furnished as required.

★ Baskets in perforated metals or wire mesh.

★ Load/Unload Stand for convenient and fast handling of work load.

MADE IN TWO STANDARD SIZES

Standard Openings	3/32″
6″ x 12″ I. D.	$186.50
8″ x 18″ I. D.	$295.00
Stand	$ 39.50
Perforated metal	$ 9.15
Wire mesh	$ 6.15

Write for Our New Catalog . . .

"Complete metal finishing equipment & supplies"

Serving Industry for 35 Years

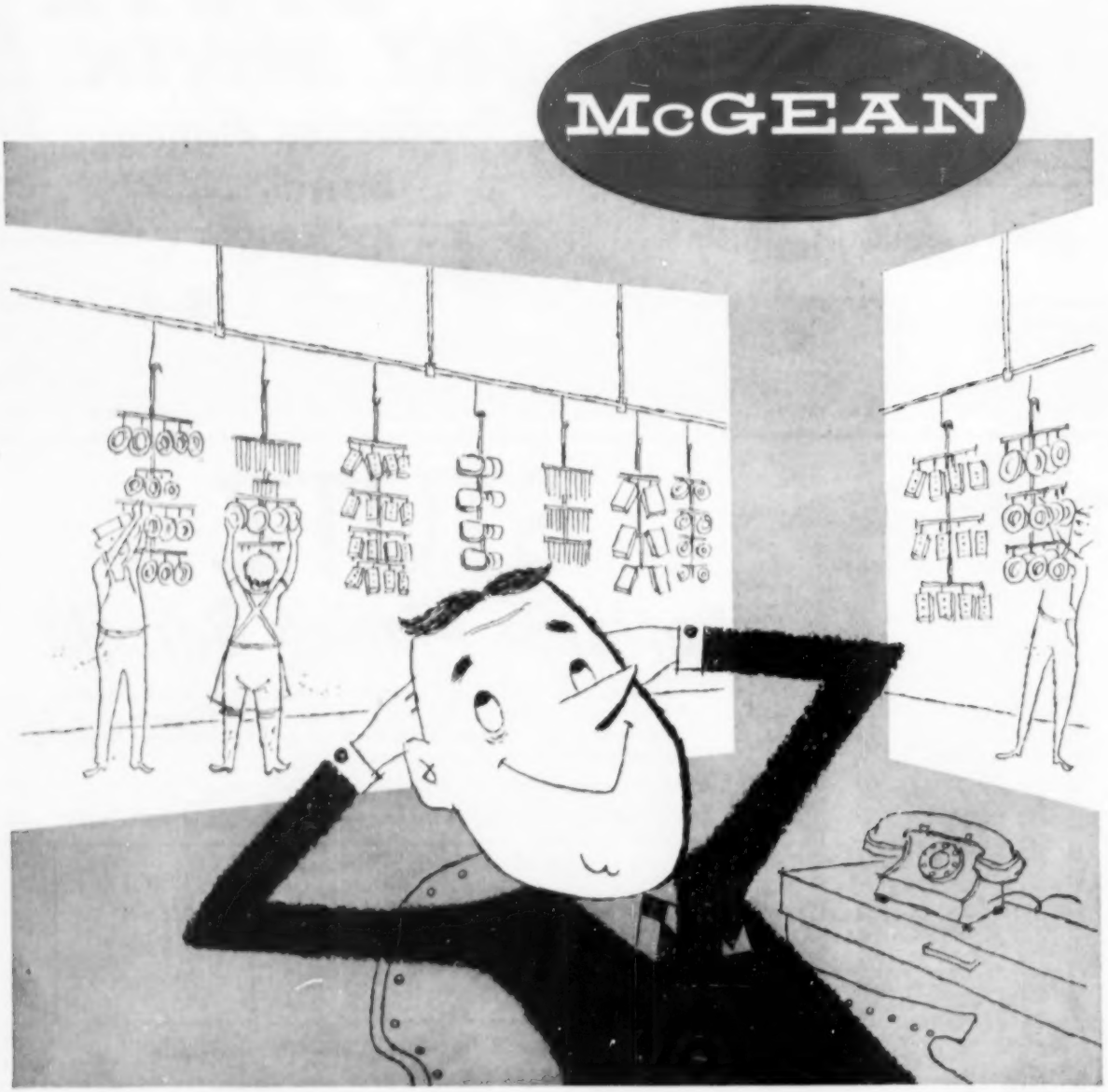
GEO. A. STUTZ MFG. CO.

4420 Carroll Ave., Chicago 24, Ill.

...enjoy that "steady production feeling"

Use McGean Anodes and Chemicals

THE McGEAN CHEMICAL COMPANY 1040 MIDLAND BUILDING CLEVELAND 15, OHIO



PURCHASING PROBLEMS

of a Manufacturer of Metal Finishing Equipment*

By
E. M. CLOSE†

Much has been said and written of late about the importance of the purchasing function and management's recognition of the need to include the modern day purchasing agent in the intimate councils of management.

As a result of the technological advances that have been made in the electroplating industry during the past 15 years, purchasing agents are more dependent than ever upon the technicians within their organization who share with them a seat in management.

The object of this paper is to present to purchasing representatives and technical representatives of the electroplating industry a picture of a few of the problems which are confronted in the procurement of materials for the manufacture of electroplating equipment.

First, a definition of electroplating. In Chapter 2 of Dr. A. Kenneth Graham's new book, electroplating is defined as a "process whereby a metallic object is coated with one or more relatively thin, tightly adherent layers of other metals. It is accomplished by placing the object to be coated on a plating rack or a fixture, or in a basket or in a rotating container, in such a manner that a suitable current may flow through it, and immersing it in a series of solutions and rinses in planned sequence." This is accomplished by using a combination of several pieces of equipment. The extent of the equipment from the standpoint of size of generators, the number of filters, heat exchangers, tanks, etc. is dependent upon the job to be accomplished. The electric current is generally supplied by the use of a rectifier or low voltage motor generator set. The actual plating may be done in plating barrels, in still tanks, in a semiautomatic plating machine, a heavy duty automatic plating machine or, as found in the automotive industry, large full automatic platers. In this broad general field of electroplating equipment we may also include such items as alkali washers and degreasers.

There are very few pieces of electroplating equipment that can be classed as shelf goods items. This factor is the one that creates the problems at the procurement level. While our sales group is able to provide us with estimated sales in certain general categories of electroplating equipment, there is such a combination of requirements that materialize with the customers' orders that we in purchasing are unable to anticipate, that our buying or our committing for pure inventory is limited to very basic standard raw materials and semifabricated parts. In other words while a 5000 amp 6 volt motor generator set is an item that appears to be a product that could be produced for stock, there are variables continually being introduced as a result of individual customer requirements such as a special base, special bearings and housings, etc.

As previously stated, there are a number of basic raw materials and semifinished products that can be maintained in inventory. The determination of the inventory level of these products is one of the most important problems in procurement. We approach this problem by giving consideration to a number of factors—

1—The rate of turn-over during the past three years with the greatest weight to the average being assigned to the most recent year's usage.

2—We then project this against the available sales estimates as submitted to us by our sales group.

3—We study current market conditions which includes the availability of the raw materials, current prices and whether or not any new sources of supply are available.

4—We consult with our engineering and research groups to determine if the item or items in question will continue to be used in the manufacture of the end product. We find that oftentimes the engineering group are planning a change in design which would preclude the use of a particular product in future manufacturing operations.

At this stage, it becomes quite obvious that the major procurement for the manufacture of most plating equipment must be done on a job basis.

In order to provide a clearer picture of some of the reasons for our procurement problems let us trace the steps leading up to the production and delivery of an automatic plating machine from the time your management decides to purchase such equipment until the buying is complete. Let us assume that our sales engineer has been invited by Company X to quote on a unit that will copper, nickel and chrome plate 2000 widgets per hour, this proposal to define tank sizes, foundation dimensions, cycle and innumerable other items through to its final costs. He has also been warned that the unit must be designed in such a way that it will be flexible enough to permit the plating of other items a year or two or three hence. Once he has collected this data and submitted his proposal to the customer, and forgetting competition for the moment, he gets an order for the unit. At this point the customer generally requests that his production and technical staff be advised within a short period of time of the details relating to the specific size of the plating machine, where outlets will be placed, and countless other details in order that he, the customer, may prepare for the installation of the unit.

It takes our engineering department several weeks to complete the detailed engineering drawings needed before procurement can begin. However purchasing begins to check early with the engineering group and requests preliminary requisitions for those items of a special nature and peculiar to this unit which we know will require the greatest delivery lead time. While we are attempting to gain positions in suppliers' schedules, engineering has progressed to

*Presented at the 42nd Annual AES Convention, Cleveland, Ohio. The discussion following the presentation is not included here, but will be found in the "Annual Proceedings of the AES, 1955."

†Hanson-Van Winkle-Munning.

the point where many of the major items have been translated into detailed drawings and we can now translate tentative commitments into firm orders. This generally involves such items as structural steel, special castings, tanks and gear reducers. Just about the time that we have completed placing our orders for these critical items the customer has decided that certain changes in the unit are necessary and oftentimes a sizable percentage of the drawings go back to the boards. Once these corrections have been made and the customer has approved the drawings in toto, we are now ready to complete our procurement. However we are confronted with the fact that at this stage we generally have about six weeks where past experience has shown us we will require eight to ten weeks delivery time. We also find that the special castings must first have patterns made and once received, require three to four weeks machining and assembling in the shop. We have also carefully determined earlier in the year that all units we will manufacture during the year will use ¼ x 4 bus bar. However this unit now requires ½ x 5. Warehouses usually carry a maximum stock of one ton of ½ x 5. We need 18,000 pounds and the best mill delivery obtainable is eight weeks. This does not take into account the ten days needed in order to prepare this copper for assembly on the main drive mechanism of the unit. The engineering department now announces that they made a mistake and those eleven special gear head motors that were ordered seven weeks ago must be changed to counterclockwise rotation. After much scrambling around we determine that this will lengthen delivery of these motors by 2½ weeks. We suddenly begin to realize "now" that there are some nine critical components of this unit which cannot be delivered on time to meet the customer's deadline. In fact we are now three weeks beyond that point. The purchasing group is now really on the carpet, and as has undoubtedly occurred in your company, we seek help from all quarters within the company, including sales, however we only turn to them occasionally.

In spite of the set backs and disappointments materials begin to flow in and by the continual follow-up and the exertion of pressure here and there we get the needed raw materials and fabricated parts to make delivery to the customer only a few days late.

An exaggerated picture has been presented in order to focus attention on three basic purchasing problems which exist only in our company but, it is believed, to some extent in every company.

Problem No. 1 can be stated simply as "Should we make or should we buy."

Problem 2 may be stated as "How may purchasing foster a greater degree of standardization?" and

Problem 3 is "What must purchasing do in order that their function may truly be included as an integral part of the top management team?"

In considering "should we make or should we buy," when is our company better off making a particular part or group of parts instead of buying them from a specialist in that manufacture? Or when is our company better off buying rather than making? Let's take a look into this question.

Make-or-buy has been an important question for decades. It has been the subject of countless post-mortems. Few businessmen have not run into a situation where they wished either that they had ordered a job done outside or that they had kept it in their own plant. It is felt that today this problem is occupying more hours of management thinking than usual. Costs are on every manager's mind. Here is one area for decision which may mean the difference of that little extra margin we are going all-out for.

Moreover, recent developments induce us to reanalyze our policies. On the one hand, lower taxes and more capital available seem to favor making. At the same time, our changing technology, with an increasing risk of obsolescence and greater drive to meet competition, seems to favor buying. Increased emphasis on year-round employment may force policy revisions either way (whichever will help to regularize employment in the particular plant), leading to greater subcontracting in some cases and greater in-plant making in others.

As far as can be ascertained, no authorities have been able to work out ready answers to the question of whether a company should make or buy. It is not presumed to do what they cannot. But let's avoid the kind of loose thinking which too often has characterized decisions, discussions and writings on make-or-buy. These have resulted in a great waste of money and effort. It is true we have no formulas. But it is just as true that there are times to make and times to buy—right times and wrong times. Accordingly, there is a real need for analyzing the problem from our own point of view. We must proceed independently. A conclusion right for another company may not fit our different situation. Companies leaning one way or the other on the make-or-buy question have been equally successful in America. To take one important industry, automobile manufacturing, in 1953 the General Motors Corporation paid 52.75 per cent of each sales dollar to outside suppliers; the Chrysler Corporation, 65.80 per cent; and Studebaker, 73.30 per cent. Ford Motor Company, on the other hand, is more self-contained; it even rolls much of its own steel at River Rouge, and since World War II has added 26 million square feet of space in 13 manufacturing and 7 assembly plants.

Many metalworking plants both make and buy concurrently. A recent nationwide survey of 355 companies using stampings showed that 177, or 49.8 per cent both make and buy; 20.6 per cent buy only; and 28.2 per cent make all the stampings they use. Such diversity of practice is made possible by the large number of supplying plants of all kinds, which not only make the economy more flexible in this way, but also add strength to it by reducing the capital required for new ventures.

It is very easy to over-simplify the problem as a clear cut question of either making or buying. We recognize there are a multiciplicity of reasons why companies should buy parts or make parts. Further, the picture is a changing one so that short run decisions may often be in conflict with desirable action for the long run.

Favoring making right now are the availability of capital (because the need to expand existing equipment has decreased) and in many cases more capacity. The fact that taxes today take a smaller percentage of the savings achieved by investing in new machinery is encouraging manufacturers to make more of their products themselves. In contrast, improved machines and the development of new materials and techniques favor buying. Suppliers become familiar quicker with these because their livelihood depends on doing so. Also, with suppliers more hungry for business, better prices are being offered. Cost studies are helpful in determining whether to make or buy, but they are not a complete answer in themselves. One company's meat may be another's poison. If easy decisions were possible, we would not find company presidents so frequently involved in make-or-buy questions.

To summarize, here is a check list of reasons for making and for buying:

Reasons for making—

1—Cost studies indicate it is cheaper for us to make than to buy.

2—Making fits our know-how, our equipment, and our tradition.

3—Idle capacity is available to absorb overhead.

4—What we are considering is unusual or complex; direct supervision is needed to assure control.

5—Making will facilitate our control of part changes, inventories, and deliveries.

6—The part is hard to transport.

7—The design of the part or its processing is confidential.

8—We do not wish to depend on a single outside source of supply.

Reasons for buying—

1—Cost studies indicate it is cheaper for us to buy than to make.

2—Space, equipment, time and/or skill are not available for us to develop the necessary production operations.

3—Because of small volume or because of other capital needs, the investment in making is not attractive.

4—We wish someone else to face seasonal, cyclical, or risky market demands.

5—The need for special techniques, or equipment, makes buying more logical. Our supplier will help us produce a better engineered end product.

6—We think it is best for our executives to concentrate on our specialty.

7—We want to check on our own operations.

8—Patents or customer-supplier relationships favor going outside.

Problem No. 2 was stated as "How may purchasing foster a greater degree of standardization?" Many different definitions of the terms "standardization" and "standards" are available, but it seems appropriate in the present instance to consider "standardization" as the organized solution of common problems and to consider "standards" as the record of such solutions to avoid waste of creative effort in a repetitive consideration of the same problem. In other words standardization is not a goal. It is a means, an instrument, a tool. The part that purchasing plays in resolving these common problems is in product standardization.

We, in purchasing, agree that standards are of a highly technical nature and engineers are necessarily engaged in their development. On the other hand we are convinced that there is no end to the opportunities for the purchasing agent to assist in saving money for the company through standardization of many, many items outside of the highly technical ones.

There are five rather simple questions that represent the basis for the accumulation and tabulation of facts which will show how product standardization can serve to bring about improvements. These are—

1—How much is now being spent for material and for what is it being spent?

2—How much duplication is there?

3—How much of the same material is bought to different specifications for similar use in different products?

4—What items are causing the burden on the purchasing department?

5—On what items will standardization save money and confusion?

We must take the lead and it is at the purchasing level that these facts as to the savings that can be accomplished by standardization must originate.

Problem No. 3—What must purchasing do in order that their function may truly be included as an integral part of the top management team? It is believed that purchasing must be a creative and dynamic function. Purchasing is a double swinging door—not just for salesmen to enter, but for creative ideas to come in too. The creative function of purchasing seems to be the most important of all.

We are aware that we have available to us within the organizations which supply us a very large staff of experts. If we can enlist their active assistance, we may be able to find many significant improvements which otherwise might be overlooked. Management looks to us to evaluate—and that kind of evaluation goes far beyond the question of price. Doubtless you have all heard the story of the purchasing agent who was critically ill and his doctor told him a major operation was needed to save his life.

"What will it cost?", the patient asked.

The doctor said his fee would be $500.00.

"You'll have to shade your price a little," said the purchasing man, "I've had a better bid from the undertaker."

Clearly, value analysis must take account of more than price. Frequently it demands, for example, the most careful scrutiny of technical specifications received from engineering or production departments—and it sometimes means overriding the whims or prejudices of the technical men, to come up with the right purchase.

We are counted upon to advise management on the control of investment in inventory, one of the most ticklish problems of evaluation. Materials, supplies and services must be available when needed and a reasonable margin of safety provided. Yet it is not good purchasing to hoard materials or even to overstock—you tie up money and risk loss in value. To prevent this we must be continually alert and well informed.

Next we must inform management on supply markets that often involve a very broad segment of the economy, such as metals, chemicals, textiles, commodities, to name but a few. Keeping our finger on these markets involves much more than mere statistical compilation; it is a challenge to our business judgement and ability to analyze and forecast accurately. If we are buying steel, for example, we must tell management what an effect an important development such as a wage increase will have on future prices and recommend to them how much to buy and when. While many large companies have professional economists on their staffs, in small organizations the head of purchasing must double as the company economist.

In these three broad problem fields we must recognize that in dealing with the specifics, other problems will arise, and while the specifics may momentarily present seemingly insurmountable challenges, a clear definition and understanding of the basic problem will generally result in a prompt and economical solution of the specific problem.

In the final analysis, good purchasing can only result if we in purchasing contribute more than our share on the management team.

LIQUID HONING*

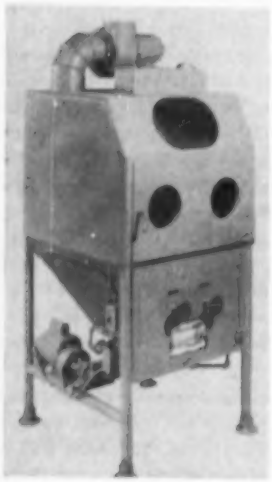
AS A SURFACE CONDITIONING OPERATION

BY W. EHLERT[1], G. KAUFFMAN[2], G. BURRETT[3]

INTRODUCTION

The purpose of this paper is to make the metal finisher more familiar with a relatively new tool placed at his disposal. During recent years, there have been rapid developments in the techniques and variety of applications of liquid abrasive blasting. Liquid abrasive blasting, or liquid honing, is the utilization of impact kinetic energy to condition surfaces by controlled abrasion using various abrasives suspended in water. The abrasive used can be graded aluminum oxide, graded silicon, or organic particles suspended in water. The abrasive and its concentrate produce varying conditions of abrasion and surface finish.

Liquid honing has been successfully applied to removing or blending tool marks and removing burrs from machined surfaces, finishing die-casting in place of polishing and buffing, preparing steel or aluminum surfaces that are to be chromium plated, increasing tool and die life, and removing scale, paint or rust without materially removing basic metal. Figure 1 shows a typical medium sized liquid honing machine.



Liquid Honing Machine

Figure 1

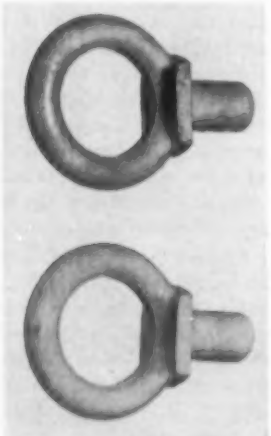


Figure 2

The first phase of the paper will cover the preparation of surfaces prior to finishing, including the use of liquid abrasive blasting to replace pickling, electrochemical cleaning and handfinishing. Ordinarily, no other cleaning is necessary on pieces that are liquid honed. No alkali cleaning is necessary because the blasted surface is chemically and mechanically clean. One exception is those parts which have a heavy coat of grease. In that case, degreasing is advisable.

The most important use of liquid honing in plating is in preparing surfaces of parts subject to hydrogen embrittlement. One of the most important factors in plating aircraft parts, where hydrogen embrittlement is a major factor, is the removal of heat treat scale without the use of acid or sandblasting. These scales can be removed in minutes by liquid honing without severely etching the metal or subjecting the part to hydrogen absorption.

* Presented at the 42nd Annual AES Convention, Cleveland, Ohio. The discussion following the presentation is not included here but will be found in the "Annual Proceedings of the AES, 1955."

†Pratt & Whitney, Reed, and Aerol Engineering.
‡E. Hofmann, Inc., Euclid, Ohio
§Cleveland Cap Screw Co.
¶R. W. Fenton & Co.

Figure 3

Figure 4

Figure 5

Figure 2 shows two identical parts of forged 4140 steel, plated in fluoborate cadmium solution. The part on the top was cleaned in the normal manner, i.e. alkali, acid, rinse, and then plated. You will note the dark nonplated areas as well as the dark over-all appearance, showing a definite noncontinuous plate. The part on the bottom was liquid honed as received and plated without further treatment.

Another important use of liquid honing as a finishing tool is removing and blending grinding lines. By blasting, the microinch finish may be considerably improved, particularly in intricate sections of surfaces usually impossible to clean by wire brushing. The matte finish produced is often smoother than a mirror finish attained by finish grinding. When blasting is used prior to decorative plating, buffing and polishing operations may be necessary, unless a satin finish is required. If the buffing or polishing operations are necessary, 20 to 60 per cent of the time normally required to polish or buff is eliminated.

The removal of feather edges and metal fuzz left by grinding and polishing is another practical use of liquid honing. In many cases, if plating is applied without first blasting the part, the compound from polishing will tend to adhere to the feather edges and be difficult to remove by normal cleaning procedures. Peeling of the plating is then likely to result.

It is estimated that the surface area of metal increases as much as eight times as a result of liquid abrasive blasting, thus increasing the surface to which electroplate or painted coating can adhere mechanically. Figures 3 and 4 are standard paint sample sheets, with one-half of each panel liquid honed. The sample in Figure 3 was blasted prior to painting with 60 screen grit and the sample shown in Figure 4 was blasted with 300 screen grit. A knife was used to scrape the paint from the honed and unhoned surfaces of these sample plates. You will note the paint was hardly cut through on the surface which had been honed with 60-screen grit. The sample in Figure 4 does show lack of adhesion of the paint because the surface area is less than the panel in Figure 3 by nearly 40 per cent.

Liquid honing is used for preparing critical areas for inspection prior to plating, especially aluminum and magnesium castings and forgings and other non ferrous metals, to expose pits or porosity where machine grinding or polishing has caused metal to flow over the defective areas. Figure 5 shows a section of an aircraft valve body after final machining operations, prior to final hard chrome plating. About 20 per cent of these valve bodies were rejected previously because of pitted chrome plate. The plater, who has wet abrasive equipment, is now inspecting these castings, using 1200-screen silica for an inspection tool, prior to plating and has reduced rejections to 1 per cent. The finished part shown in Figure 5 has been liquid honed prior to plating. Porosity in the bore of the valve is clearly visible, although the surface before blasting, to the eye, appeared to be free from such defects.

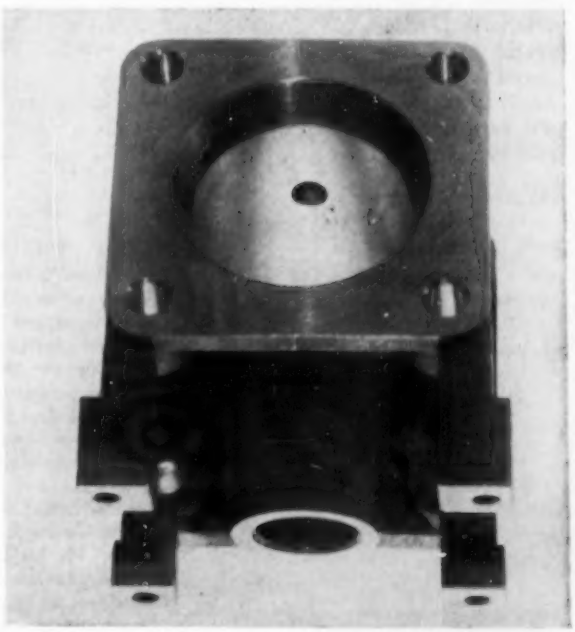


Figure 6

It must be remembered in the plating industry where the liquid honing method is used, or will be used, that the finish obtained by blasting is a function of smoothness of the basic metal. Blasting will not make a rough ground piece as smooth as a finished ground piece. Liquid blasting will improve and chemically clean a good finish, but will do little to improve pitted or uneven surfaces. In most cases, the liquid hone method will magnify all these imperfections. One important advantage in the use of liquid honing, prior to plating of high carbon steels, malleable iron and cast iron, is the fact that the surface can be cleaned without liberating carbon or graphite smuts which all platers recognize as a severe problem in plating.

TOOLS AND DIES FOR INCREASED LIFE

Liquid honing produces a cold working effect similar to that of shot peening, and also produces a strikingly uniform surface finish. Several manufacturers in the nut and bolt industry have experimented with the liquid abrasive methods for possible increase of thread roller die life. In 1953, a leading manufacturer of screw and bolt products ran tests for 11 months on thread roller dies.* This test, which has now been completed, shows conclusively a die life increase of 24 per cent overall. A number of the largest screw and bolt product producers are now using the liquid abrasive blasting method to treat thread roller and hot header dies, trim dies, and punches. The life of these tools in the nut and bolt industry has been increased because of the cold working effect, the removal of small burrs, and the conditioning of the surface, which improves lubrication. Crush ground dies have shown a 20 per cent increase in life because of these factors.

The application of abrasive blasting to increase tool life is primarily concerned with tools manufactured from high carbon steel, heat treated to 52-64 Rockwell. This includes thread roller dies, end mills, milling cutters, trepanning tools, seating tools and drills.

The liquid abrasive, as used in the tool life study referred to above, is a mixture of abrasive and water, with the slurry kept in suspension by air agitation. This mixture is fed by syphon to a nozzle, where it is ejected at high velocity by means of compressed air, pressures of 80 to 100 psi. The nozzle of the gun is designed in such a manner that the abrasive water mixture, flowing down the central tube, is accelerated by the air blast just as it leaves the tip of the nozzle, so that abrasion of the nozzle is reduced. The abrasive mixture used in early tests of liquid honing thread dies, including milled and crush ground types, was 7 pounds of 60 screen sand per gallon of water; however, it was later determined that there is an advantage in using fused crystalline alumia because of its greater resistance to breakdown. Grain ranging from 1 to 300 microns, mean particle size, is suitable for these applications. The tests made showed it important to prepare the surface of the die to an approximate 80 microfinish for good lubrication.

DIE AND MOLD CLEANING

Heat treat scale can be removed from plastic molding dies by liquid blasting, and this treatment has been successful in removing the wire edge left around engraved letters on these dies. In dies used for making electrical switch parts, and in other applications, this lettering is quite small and difficult to polish. Liquid blasting is a satisfactory method of polishing these letters without distorting them. Liquid blasting also offers an excellent method of removing grinding lines from intricate sections of the die. Some types of plastic dies require periodic cleaning, and liquid blasting is ideally suited in that it removes plastic residue without damage to the die surface.

Maintenance of molds in the rubber industry require frequent removal of carbonized deposits. Liquid blasting has increased the production life of molds which have been cleaned by this method, as compared with those which have been chemically and manually cleaned. Liquid blasting will not remove heavy uncarbonized rubber deposits left in the mold; these can easily be removed by hand, after which liquid blasting is then used to remove the carbon deposits. This method does not change mold dimensions or contours.

CONCLUSION

The authors have attempted to high light the most common use of liquid honing, and perhaps a few uses new to this industry.

Although liquid honing is not new, it is still not found in most finishing plants. It is the hope of the authors that their experiences, as related in this paper, may be of assistance to the reader in putting liquid honing to use in solving some of his finishing problems, or in assisting the users of liquid honing to find new applications for this valuable tool.

WILLIAM C. EHLERT

William C. Ehlert was born in Cleveland, Ohio, and attended school there. He has been engaged in the mechanical preparation of metal prior to plating or painting for the last ten years. Ehlert spent three years with the Weatherhead Co., 8 years with Cleveland Pneumatic Tool Co., and 4 years as Sales Manager of Domar Products, Inc., where he helped to develop one of the first processes of reversed plating for the polishing of stainless steel in the Cleveland area and, at present is associated with E. Hofmann, Inc., Euclid, Ohio. He has been working with many special applications for the preparation of metals via the liquid honing process.

SCIENTIFIC PAINT EVALUATION

BY E. A. ZAHN

The Importance of the Finish

The applied finish is industry's best salesman. Everything manufactured gets a finish of one kind or another. If the finish were to serve only a single purpose, we would perhaps be justified in treating it rather lightly.

The finish protects our products. It beautifies them to become more and more appealing to our customers. It must incorporate color and in many cases multi-colors. Last, but not least, it is no longer enough when a finish lasts for a normal product life. It must keep it looking new for its normal life.

Finish Handling is a Serious Business

All the way from the raw paint materials to the applied finish, each step must be scientifically treated. It isn't just a mixture of pigment, resin, and solvent. Minor variables in raw materials can govern the performance of the finished product. The compounding of raw paint materials is equally important. Very minor variations in compounding can result in appearance and performance variables.

Industrial paints are not milled mixtures taken from the paint manufacturer's stock. Each and every one is an individual and special development. The care used by the development engineer and the formulator must, in every detail become the control factor in the paint manufacturing process.

The Importance of a Finish is Often Misunderstood

Too often, there are too few people involved who realize the importance of paint material handling, and more particularly in the evaluation of a finished paint product. Each and every large industrial paint user has his paint laboratory. There is little similarity between these laboratories and there is less similarity in the methods used to evaluate paint. Naturally then, we have a variety of test results but unfortunately it is not always a true picture. Often what looks like the best sample out of ten submissions may actually be inferior to all of them.

Look for Good Features, Not for Reasons to Reject

It is little wonder that some laboratories have found it necessary to test paints with a reverse objective. They receive so many samples that the major problem becomes one of finding fault with each of them.

We should approach the paint sample testing problem with the idea that each one may have a hidden quality which we must find. We should look for the good in samples. We should always compare samples with certain known standards and we should have certain standards in our testing procedure.

New Materials

It is not exaggeration to say that all industrial paints are new when compared to the paints used only a very few years ago. Yet, the instruments and the testing methods are much older. In many respects, present day instruments are being strained in order to show any effect on some of the newer finishes.

Finishes must be tested on an accelerated testing schedule for the safety of the user. It is true that we are trying to apply ten years exposure in ten days of testing. This is the exact reason why the approach must be more scientific than it has been in the past.

Not too long ago, humidity tests were carried out at 100° F and 100 per cent relative humidity for thirty days. A finish failing in that test today would be useless. The alternative is to raise the temperature of the test. This acceleration becomes dangerous because we soon create test conditions having no similarity to product end use exposure. We must search for fine small differences in materials without over-exposing the product to meaningless conditions.

More and more exciting new products are being offered to the industrial user. The performance of some of these new products is nothing short of amazing. Through these new products, the wide space in the performance difference between organic finishes and vitreous enamel has been all but eliminated in many cases.

In the Hands of the Chemical Industry

The industrial paint business is presently in the hands of the chemical industry. The greater portion of the gains made in material development has been accomplished with

man-made resins, pigments, and solvents. Much greater control can be exercised in the production of synthetic materials than was ever possible in the case of the natural oils and gums previously used. It is obvious then that greater care and a more scientific approach in the evaluation of these improved products is essential.

Too Many Samples

The progress made by any laboratory group, user or producer, is no longer based on how many samples are tested per year. The only true measure of laboratory progress is the dollars and cents earned through improvements in materials and their adoption to a production advantage.

Previously there had been too many samples. More careful scientific testing can produce more useful results with fewer samples. A user's laboratory grinding out test results often must overlook the finer differences in materials and soon finds that too little finish progress has been made. By the same reasoning a paint manufacturer's laboratory which grinds out a large volume of samples also grinds out a large number of errors. A reasonable approach would be to test half as many samples twice as carefully.

One Hundred per cent Instrumentation

The pocket knife is of course a popular paint testing instrument and without it today we would know little about the adhesion characteristics of a finish. The knife must go and other similar instruments of habit must be replaced by more scientific instruments. The quality of present day finish products must be studied with one hundred per cent instrumentation on which direct reproducible readings appear. The reading graduations must be fine enough to detect minor property differences.

Grading Procedures

Instrument readings alone are not satisfactory. The readings must serve as a means to grade the performance ability of a material or a system in terms of per cent performance value and no longer as a measure for comparison.

Modern grading procedures are being adopted in industry. They are the keynote in preparing useful and meaningful performance specifications. The new grading procedures, if sufficiently standardized may well become the first real step towards industrial paint formulation specifications.

Surface Preparation

It is well known that a slight variable in the surface preparation of test pieces can result in major differences in the final result. Much care should be given to test piece surface preparation. Above all, the surfaces of test pieces must be uniform in any scientific material evaluation.

Sample Application

Sample application technique is equally as important as surface preparation. Regardless of application method, the test pieces must be uniformly treated. They must have identical film thickness and all pieces in a set must have the exact same treatment. A one-tenth mil variation in film thickness will most definitely produce a different result in a carefully conducted test program

Sample Cost

There have been many estimates of paint sample cost. Some of these costs have been recorded as being over one thousand dollars per gallon. The cost of testing is no small item. It stands to reason then that we should handle them accordingly and look for the best properties rather than a reason to reject them.

Parallel Testing

Some users' laboratories have adopted the policy of parallel testing with the supplier. This has many advantages. It serves as a check on instruments and test conditions as well as application conditions. The supplier, on the other hand, has an opportunity to follow his samples in test and the comfort in knowing that he is being fairly treated by the user.

New Instruments

Some testing instruments are adequate for use in paint film evaluation. Many of them are not adequate and have become more or less useless due to continuous progress in paint development. There are some areas of testing where certain tests can no longer be considered accelerated because the exposure time required is too long.

Summary

A realistic cooperative effort is being made by some users. Many paint suppliers are beginning to subscribe to the "New Look" in scientific paint evaluation. The cooperation of the testing instrument manufacturers and the independent testing services are also necessary.

More practical standardization of paint testing practices would be helpful. Some one will have to carry the ball on new testing instrument development. It appears at this moment as though the user has considerable to gain and the paint supplier gains an opportunity to protect his interests by scientific means rather than by specialized selling techniques.

E. A. ZAHN

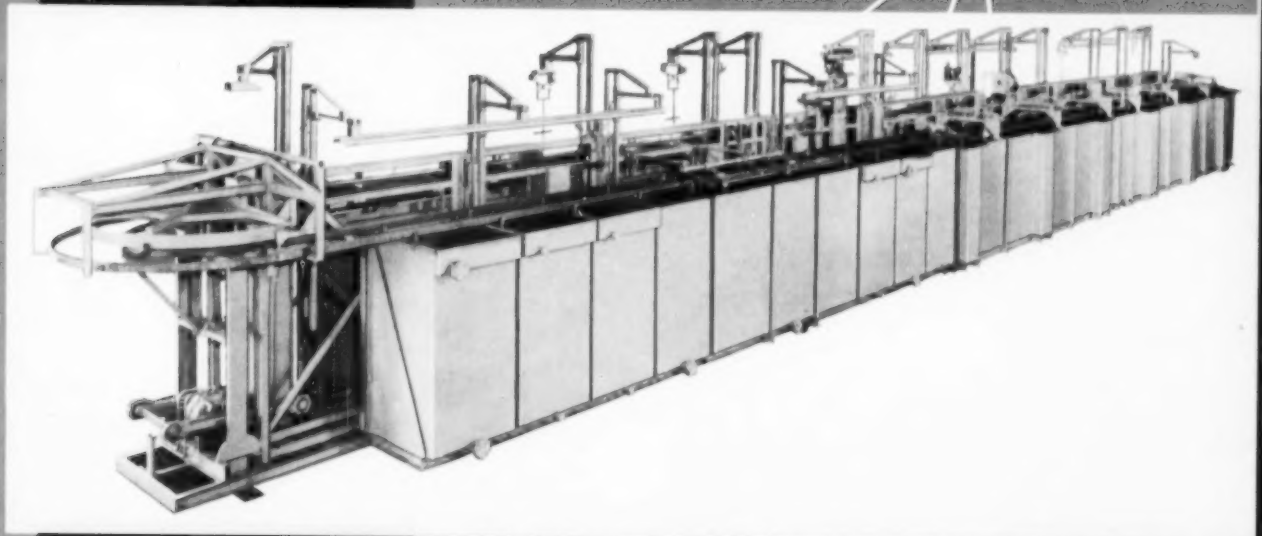
E. A. Zahn has spent twenty-six years in research on industrial paints and application-methods and is well qualified to write on the subject.

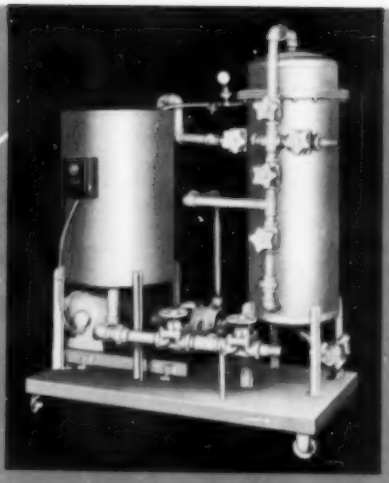
He is the inventor of the Zahn Viscosimeter and has acted as consultant to many manufacturing concerns. In 1938 he received the Charles A. Coffin award for contributions made to the electrical industry. Zahn has been associated with General Electric for twenty-six years, and is at present Organic Finishing Engineer at General Electric's new Appliance Park, Louisville, Kentucky.

BULLETIN 555

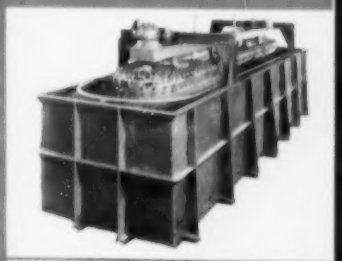
tomorrow's equipment today

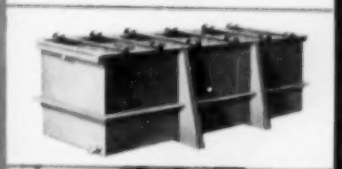
WAGNER BROTHERS
automatic plating equipment and supplies

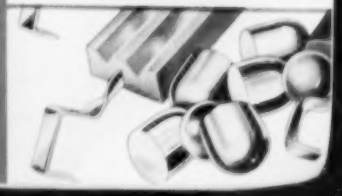




RECTIFIERS
AUTOMATICS
SEMI-AUTOMATICS
FILTERS
TANKS & LININGS
ANODES
WASTE TREATMENT SYSTEMS



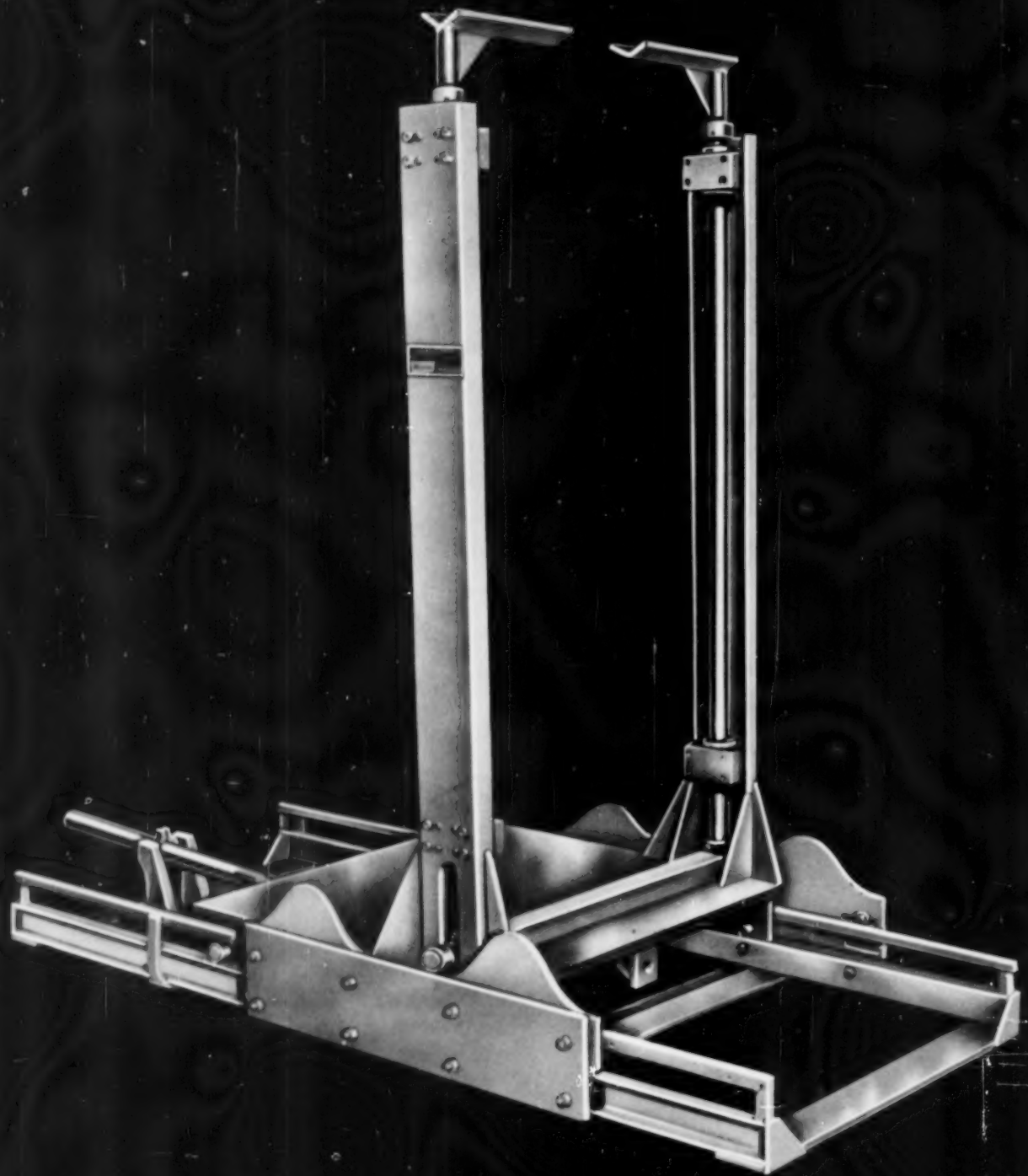




400 MIDLAND AVE. • DETROIT 3, MICHIGAN

Chicago • Rochester • Cleveland • Cincinnati • Indianapolis • New York

WAGNER BROTHERS'



NEW *AUTO-LOADER**

Does a man's job . . . cheaper, faster, better!

Still manually loading your automatic? Workers complaining about lifting heavy loads? Looking for a way to decrease labor costs, to add several thousand dollars to your net profits? Well, Wagner Brothers' new Auto-Loader can solve your problems!

Because it eliminates expensive manual loading operations, the Auto-Loader costs you nothing—it pays for itself.

It makes no difference what make or type of automatic processing equipment you now have; the Auto-Loader is *easily adapted to any automatic using an intermittent motion,* double or single lane. If desired, Wagner Brothers will engineer it into your present system at a nominal service charge.

Unlike some automatic loaders, the Auto-Loader will accommodate a monorail conveyor operating on different planes—you needn't rebuild your conveyor.

Its rugged construction, absolutely simple design virtually eliminate maintenance headaches, even under continuous heavy service.

All transfer mechanism is mounted on a reciprocating platform, moving on rollers in a channel track. Cam followers attached to the lifting arms duplicate the eccentric contour of the side plates to raise and lower the lifting arms into the loading and unloading positions. The cycle of the Auto-Loader is controlled by the limit switches of the automatic, actuated by a hydraulic cylinder (or an electric drive) to move in perfectly-timed unison with the transfer cycle of the automatic.

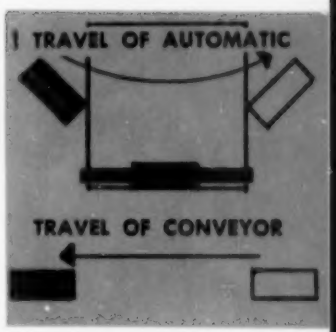
**Patents Pending*

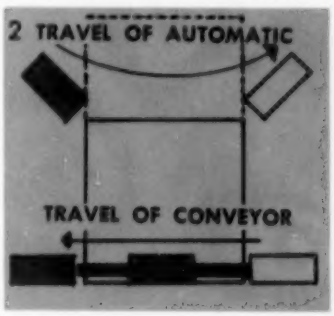
The Auto-Loader can be used for any automatic parts processing operation such as electroplating, anodizing, phosphate coating, etching, electropolishing, oxide coating, painting, cleaning, etc.

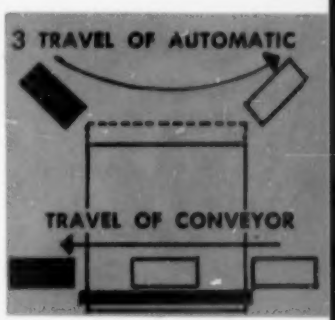
WRITE NOW FOR PRODUCT INFORMATION AND QUOTATION

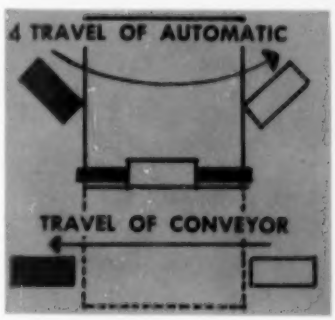
OPERATING CYCLE —LOAD & UNLOAD

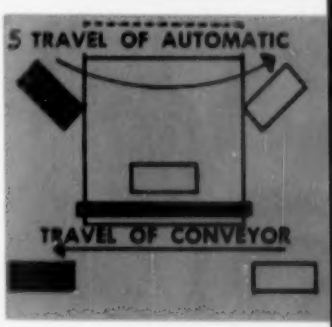
1—Processed rack being unloaded from machine.
2—Processed rack loaded on conveyor.
3—Conveyor indexing.
4—Unprocessed rack loaded on machine.
5—Machine indexing.











PROCESSED RACK UNPROCESSED RACK

WAGNER
BROTHERS, INC.
400 MIDLAND • DETROIT 3, MICH.

ELECTROLYTICALLY PURE ANODES RECAST FROM *YOUR* NICKEL SCRAP

CONVERT YOUR "WORTH LESS" NICKEL SCRAP INTO PUREST ANODE FORM

A scrap bin full of useless ends, swords and stubs is "worth less" to you. But we can convert this valuable nickel into production-ready anode form, save you dollars you'd lose selling scrap to dealers and purchasing new nickel anodes.

HERE'S HOW WAGNER NICKEL RECASTING CAN BENEFIT YOU

1. **ELECTROLYTICALLY PURE ANODES** – We have a long established reputation for recasting under strictest metallurgical controls – your assurance of 99% pure nickel anodes.
2. **YOUR SCRAP, YOUR ANODES** – You get your own metal back. We do not pool scrap shipments but process each job with individual attention.
3. **MODEST HANDLING CHARGE** – You'll be amazed at how inexpensive it is to turn now "worth less" scrap into good anodes. Our fair prices have made us a leading supplier to the major job plating and manufacturing companies in the metal finishing industry.
4. **READY FOR IMMEDIATE PRODUCTION** – We'll return your nickel scrap in oval cast shapes, to the length you specify, tapped and drilled for hooks.

A WORD OF CAUTION

Unless you are *absolutely sure* of your metal broker, we advise against buying nickel scrap of dubious quality. We reserve the right to refuse junk scrap.

CONSULT YOUR NEAREST WAGNER REPRESENTATIVE OR OUR HEAD OFFICE NOW FOR AN IMMEDIATE QUOTATION

POPULAR WAGNER ANODE FORMS

COPPER	NICKEL	ZINC	TIN	BRASS	TIN-LEAD	TIN-ZINC	CADMIUM	ANODE
●		●		●				FLAT-TOP*
●	●	●	●		●	●		ISOCAST OVAL
			●			●	●	CAST 'BALL
●			●		●			ISOCAST SLAB
●								LECTROCOP†
●								FORGED BALL

†TRADE-MARK *REGISTERED TRADE-MARK

MAIL

WAGNER BROTHERS, INC.
400 Midland Ave.
Detroit 3, Michigan

I'd like more information describing the products checked.

- ☐ Full Automatic Plating Systems
- ☐ Semi-Automatic Platers
- ☐ Electroplating Rectifiers
- ☐ Plating Solution Filters
- ☐ Tanks and Linings
- ☐ Anodes
- ☐ Nickel Brighteners
- ☐ Waste Treatment Systems
- ☐ Nickel Recasting

LITHO IN U.S.A.

NAME_____ TITLE_____

COMPANY_____

ADDRESS_____

CITY_____ STATE_____

OUTLOOK
FOR THE DISTRIBUTION OF NONFERROUS METALS*

By
SIMON D. STRAUSS†

The nonferrous metals which are used by the plating industry are many, but the ones of chief interest are cadmium, copper, zinc, silver and nickel. Of these, information about the current economic position of the first four is given. The author's company is itself not a producer of nickel in any large amount, although a certain amount is recovered as a by-product in refining operations. Also they are sellers of nickel salts to the plating trade. That production has just gotten under way.

However, it is felt that the worldwide implications of the nickel situation are such that only somebody who is dealing with the broader aspects of the nickel problems from day to day is really qualified to speak of it. There is plenty of material of interest in the remaining commodities and particularly the one mentioned first—copper. It is doubtful that in recent economic history any commodity has acted more contrary to the expectations of people who are familiar with that commodity than has copper in the last two years.

In that period of time, purchasing agents, producers, consumers and the public generally have been completely fooled by the behavior of the copper market. The general expectation in the middle of 1953 and through the early part of 1954 was that the copper market was due, if not for a collapse, at least for a severe recession. Stocks of copper in the hands of producers were accumulating rapidly. The Chilean government had become so tangled up in its own financial position and had accumulated such a very large stock of unsold copper that the general expectation was that the price of 30c (then prevailing in the United States) would drop some said to 24c, some said to 20c. At any rate the expectation was general that the price would drop.

Acting on this belief, most purchasing agents restricted their purchases of copper to the minimum possible quantity. Instead of a drop in price, there have been two advances in price; and, today although the productions of copper is at the highest rate that it has ever been, there is a pronounced shortage.

Now, how did it come about, how serious is it, and how long will it last? The important thing is, first, to look at the organization of the world copper industry. Actually, if we except the areas behind the Iron Curtain, there are only five present sources of copper that can be considered substantial. These are the United States, Chile, Northern Rhodesia, the Belgian Congo and Canada.

These five countries among them are currently producing copper at the rate of about 2,700,000 tons a year, which is roughly 90 per cent of the 3,000,000 tons a year that represents the current rate of copper production in the free world. Thus 90 per cent of all copper comes from these five countries. In three of these five countries, we have had serious labor difficulties within the last year. It is the interruption in production arising from these labor difficulties that has really caused the present shortage of copper.

In the early part of 1954, the stocks of copper, refined copper, in the hands of world producers (on a world basis, because actually the copper market is only one market) were rapidly approaching the level of 400,000 tons, almost double what they had been a year earlier.

In other words, in one year unsold stocks in producers' hands had doubled. Most of this, as was indicated earlier, was in the hands of the Chilean government, which was stubbornly adhering to the belief that the price of copper was too low at a time when everybody else thought it was too high. The Chilean government had geared its entire economy to the price of copper; copper is the principal export of Chile and accounts for roughly 60 per cent of the tax revenue of that country.

Therefore, the Chilean government said, "We are not going to sell our copper for a lower price; if we cannot sell it for the price we want, we won't sell it at all." They had accumulated this large tonnage and the economic situation in the country was causing a great deal of concern.

They engaged in certain negotiations with our own government. The State Department felt if something was not done to relieve Chile, it might very well be that there would be economic difficulties that would lead that country to go communist. As a consequence, in April 1954, in spite of the large surplus of copper in domestic producers' hands, our government decided to buy 100,000 tons from the Chilean government at a fixed price of 30c a pound.

At that moment, although the larger producers here were quoting a price of 30c, copper was freely offered in other markets at 27c or 28c. One hundred thousand tons was transferred to government hands and caused a corresponding drop in producers' stocks. In July, the labor unions in this country decided they wanted a more generous increase in wages than the producers offered them and a series of strikes ensued. This caused an interruption in supply here. Within a matter of months there was a strike in Chile. Strikes here and in Chile were settled, but not until the price of copper in outside markets had risen from a level of 27c to 28c in the spring, to a level of 34c to 35c.

After the strikes were settled, it appeared things were going to simmer down, but at the turn of the year, the Northern Rhodesian copper industry, which is the principal source of supply of the United Kingdom, went out on strike and that strike was a 100 per cent strike—that is, every one of the mines in Rhodesia closed and the British consumers, seeing the source of 90 per cent of their copper on strike, became panicky. The price in London rose; the increase in the price in London diverted scrap from this market to the London market; the shortage of scrap and later of refined copper in this country, put pressure on this market, with the result that we had an increase in price from 30c to 33c and then 33c to 36c, which is the price that exists today.

Strangely enough, most of the copper producers are very unhappy with this situation. Looking at the picture for copper over a long run period, it is felt that a 36c price is definitely excessive in relation to competitive materials. We fear the loss of some of our long-time traditional markets. We would like to see a lower price, but when the demand from consumers is as insistent as it is, there is no effective way of lowering the price.

In the copper industry, in the long run the price is determined by what you may call the marginal supply. Eighty

*Presented at the 42nd Annual AES Convention, Cleveland, Ohio. The discussion following the presentation is not included here but will be found in the "Annual Technical Proceedings of the AES, 1955."

†American Smelting & Refining Company.

to 90 per cent of all the copper is produced by a handful of large companies. The extra 20 per cent comes from small mines and from scrap (refined copper) and this 20 per cent is the tail that wags the dog, always has, and always will.

Platers, use a very small portion of the total supply of copper. Approximately, the use of copper for plating in the U. S. is only 2 per cent to 3 per cent of the total consumption of copper in the country. Nevertheless, that 2 per cent or 3 per cent is extremely important to you. It is felt that the question of price is less important to you than the question of availability. You are asking yourselves, are we going to be able to get copper—we are having a hard time getting it now—how long will this last?

It is encouraging, from your standpoint as consumers of copper, to recognize the fact that the interruptions in supply which caused this shortage have been the result not of curtailment on the part of producers, nor of lack of reserves or unavailability of basic raw materials, but rather have been the result of labor troubles which after all sooner or later must come to an end.

It should be encouraging, too, to realize that the copper producing capacity of this country alone is in the course of being expanded by about 20 per cent. Not all of that additional capacity is effective as yet; part of it will not be in operation until next year, but, as stated earlier, world copper production is already running at a record rate today.

In the month of May, according to the statistics of the Copper Institute, world production was 250,000 tons a month, or 3,000,000 tons a year, outside the Iron Curtain. Previous record production from this particular group of countries has been 2,500,000 a year. So if the May rate were maintained, the supply would be 20 per cent greater than in any previous year, and, as indicated previously, additional capacity is coming into being. Far from exhausting the available supply in copper, in recent years there have been major new discoveries in copper reserves in many countries of the world, the United States among them.

Although many people are inclined to think that the United States is a fully matured country as far as development of natural resources is concerned, the fact is that within the last ten years more new copper ore reserves have been developed in this country than in any other and we have a longer life assured for our copper producing industry at home than we have ever had.

In addition to that, however, there have been major developments of new copper deposits in Canada, in Africa, and, of perhaps the greatest value of all from the standpoint of future stability of copper, in Peru. In the past Peru has been a small producer of copper. Now, the author's company, together with two or three others which have been exploring areas in southern Peru, has succeeded in developing there a resource of copper which may enable Peru within five to ten years to become a producer of the order of magnitude of Chile, the Belgian Congo or Canada.

This is mentioned because it seems that one of the basic reasons for the difficulties of the copper industry is that too few countries are major producers. In other words, because of the fact that it accounts for so large a proportion of the world's supply, the Chilean government has been able to have a dominant effect on the marketing of copper in the last year. The more new producing areas are brought into effect, the less likely is it that one seller can dominate the market in the future.

Consequently, to summarize for copper, it seems quite obvious that the shortage will end and that in due course the supplies of copper will be available in more than adequate quantity, not only for your needs, but those of industry as a whole.

A second material which is of considerable interest to the plating trade is zinc. The history of zinc in recent months has been quite different from that of copper. The zinc producing capacity of the world has been expanded very rapidly since the Korean crisis occurred. At that time the governments not only of the United States, but also of Great Britain and some of the continental countries, were convinced that zinc might become one of the most serious bottlenecks in the defense effort which was then being undertaken. As a result, a number of arrangements were made to encourage the production of zinc in numerous areas of the world.

These efforts were successful beyond the expectations of those who undertook them. At any rate, zinc had been in such short supply in early 1951 that the Prime Minister of Great Britain, Mr. Attlee, made a special trip to the United States for the sole purpose of convincing President Truman that he should release some zinc to the United Kingdom from the stockpile. Within a year from that time, the supply of zinc was in excess of the demand and the price of zinc which had been fixed at 19½c by the Office of Price Administration, started to drop, continued to weaken all through 1952 and 1953, until early in 1954 it reached a level of only 9¼c, less than half the price that had existed during the Korean crisis.

The capacity to produce zinc has been expanded in every major producing country in the world, including the United States. However, our actual production is not fully utilizing our mining capacity, simply because the price of zinc is not sufficiently high to encourage domestic miners to produce at capacity. On the other hand, by importing ores of foreign origin, the domestic smelting industry in the United States today is operating at the highest rate it has ever reached.

The production of metallic zinc this year will exceed 1,000,000 tons. The previous record had been about 950,000 tons. There has been some recent strengthening in the price of zinc reflecting an improvement in consumption by the die casting industry and to a lesser extent by the galvanizing industry. It also reflects government policy of buying zinc for stockpiling. This policy was undertaken as a result of the request made by the domestic zinc miners for government assistance when the price fell to very low levels. The administration turned down a request of the producers for a higher import duty.

In its place, the government decided upon a policy of buying zinc to add to the national stockpile. The theory behind it, which has been attacked by some purchasing agents, was not entirely farfetched. The theory was that if the price of zinc was so low that our domestic mines were operating at less than full capacity, that meant that we should have a larger tonnage in stockpile for possible emergencies than we would need if our mines were operating at full rate.

At any rate, the government has been buying for stockpile since August of last year and President Eisenhower, through the Office of Defense Mobilization, recently indicated purchases of zinc for stockpile will continue at least through the end of next year.

If this is so, it seems likely that the price of zinc will be maintained at least at its present level and that possibly it will rise further.

On the other hand, the government has given no assurance that it will continue to buy for stockpile if the price should advance very sharply. For instance, the price is now 12½c a pound; the indication is that the government will perhaps

buy at 13c a pound, but it is fairly clear it would not buy at 15c a pound. Were the zinc producers to attempt to increase the price to a level of 15c and were government stockpiling to cease, then the supply available to industry for its current purchases should be more than adequate to take care of any given need. In other words, zinc consumers ought to feel reasonably assured of being able to secure the supplies they require at around these prices.

There is one possible exception; the use of Special High Grade zinc by the die casting industry is currently increasing so rapidly that it is temporarily outstripping the capacity of the industry to produce material of that one specific grade.

However, given time, the industry can convert part of its present capacity to take care of requirements of this grade.

To summarize the position of zinc, the outlook is for a reasonably normal supply at prices around the current levels.

A third commodity which is of considerable interest is cadmium. That is in a very different category from either copper or zinc. Where copper and zinc are materials which are primarily mined for their own value, the production of cadmium is derived almost entirely as a byproduct. There are no cadmium mines as such and the output of cadmium depends upon the output of other metals.

If you go back over the records of the cadmium producing industry in this country, you will see that in recent years, cadmium production has very consistently run about one-half per cent of zinc production. If zinc production was 800,000 tons, cadmium production was 4,000 tons. Today zinc production is running a little over one million tons and the cadmium production is slightly over 5,000 tons.

The reason for this is that cadmium is found as a byproduct in association with the ores of a number of other metals, but principally the ores of zinc, and it is in the process of smelting zinc that cadmium is recovered as a byproduct. No matter how keen the demand for cadmium may be, it is unlikely that anybody would expand a mining operation or a smelting operation for the sole purpose of producing more cadmium, because, as you can see, for every ton of cadmium they have to produce 200 tons of zinc. If the zinc is unsalable, the revenue derived from the sale of cadmium would be quite inadequate to pay the cost of production. This has been responsible for the periodic shortages that have occurred in the supply of cadmium. In other words, the demand for cadmium and zinc do not always run parallel; if the demand for zinc happens to be on the poor side and the demand for cadmium happens to be on the good side, you may not have enough zinc production to encourage the byproduct cadmium output.

As the situation stands today, a repetition of that situation in the near future seems extremely unlikely. In the last year or so, improvement in demand for zinc has outstripped the demand for cadmium, with the result that fairly large stocks of cadmium are now held in producers' hands.

Another fact which in the long run may lead to a greater supply of cadmium is that production of cadmium outside the United States is not as great in relation to the production of zinc as it is within the United States.

Unfortunately, complete world statistics on cadmium are not available, but it is my impression that whereas cadmium production in this country is one-half of one per cent of our zinc production, abroad it runs less than one-quarter of one per cent. Part of this is due to the fact that cadmium content of certain of the foreign ores is lower, but part of it is less effective methods for recovering the cadmium in the case of foreign smelters.

As time passes, it is reasonable to expect the technology of zinc smelting and byproduct cadmium recovery abroad will improve and as that happens, foreign cadmium supply will increase.

The fourth material is silver. That is in a different category from the three other metals because it is not a base metal at all, it is a precious metal. It was in considerable use at one time for monetary purposes. Today that use is tending to decline and for that reason, many people think that silver is on the way out.

On the contrary, the industrial use of silver is increasing very rapidly, not only in the plating industry, but a good many other industries as well—photographic films, electric equipment, are a few that come to mind.

The interesting thing about silver is that the world production of new silver has not increased in proportion. In fact, it has not increased at all, whereas the production of almost every other basic commodity has increased. The reason for this appears to be partly that silver ores are usually found at or close to the surface where they were easily found and that the ancients were far more interested in and adept at recovering silver than they were in recovering base metal.

At any rate, the world production of silver today is lower than it was before World War II. Industrial consumption of silver today is much greater than before World War II. The only reason silver prices have not gone through the roof is that a number of governments have been demonetizing their silver. They have been taking silver which they previously had in circulation in coins, and they are melting it, selling it in the bullion markets of the world. Part of the demand for silver has been met from these older sources, rather than from newly mined production.

There are good reasons to believe that this supply of silver from older sources is beginning to run out, with the possible exception of the United States where we have a large quantity in circulation in our coins. Whether our government will change its silver policy is not known. Analyzing the silver situation from the political standpoint, it is a very controversial subject and in the second place, it is not one that can be easily analyzed. However, the author's overall conclusion, with the traditional interest of Western congressional delegations in silver, is that it seems most unlikely that this country will abandon the use of silver for coins and other monetary purposes.

Thus of the four materials analyzed, the one in which there is the most possibility of a shortage developing that might last for some period of time, is silver and that is quite contrary to the opinion of most people.

SIMON D. STRAUSS

Born in Lima, Peru and educated in schools of Valparaiso, Chile and New York City.

Business career began as a member of the Editorial Staff of the Engineering and Mining Journal. Subsequently became an economist for the Standard Statistics Company, specializing in nonferrous metals, coal and construction industries. In 1941 was appointed to the staff of the Metal Reserve Company, wartime R.F.C. subsidiary, of which subsequently became Vice-President and Deputy Director. Since 1946 sales staff of American Smelting and Refining Company; became Sales Manager in 1947; Vice-President in 1949; and elected a Director in 1953. Also a Director of Revere Copper and Brass and General Cable Corporation.

JOB PLATING SHOP COSTS AND THEIR RELATIONSHIP TO PRICING*

By

ARTHUR G. PIERDON†

American industry has gone through a period of rapid change in the last fifteen years. The job plating shop, large or small, has been far from immune to these changes. The introduction of bright, high speed solutions with all of the correlated equipment has made it necessary to greatly enlarge the amount of invested capital per employee. This factor alone, with the attendant increase in maintenance, increases the necessity for a more accurate knowledge of all costs.

Almost every improvement which increases the unit output per man hour of labor will also increase overhead expense so that the reduction in cost per unit is not directly proportional to the decrease in the cost of labor.

The purpose of this paper is to review the many expenses encountered in operating a job plating shop by using the results of a cost survey made by the National Association of Metal Finishers, and to suggest a simple method for rapidly determining whether the sales price on an individual order has yielded a profit. This method may not be of much value to the larger shops with long production runs, but for the small and medium shops who handle a wide variety of relatively small orders it will provide a reasonably accurate formula with which some of the guesswork in pricing can be eliminated.

This survey form was made by combining the profit and loss statements of several companies in order to arrive at a standard form which would be useful to each member as a basis for comparing his costs to the average. The breakdown of expenses closely parallels standard accounting practice and it will not be difficult for any company to make its profit and loss statement coincide with this form.

Because of the wide variety of work done by job shops and the fact that some specialize in certain types of plating, it is

NATIONAL ASSOCIATION OF METAL FINISHERS COST SURVEY
For the calendar year 1954

Classification	A	B	C	D	E
1. Direct Labor	29.7	29.7	28.2	28.4	29.4
2. Indirect Labor		6.6	9.4	9.0	11.0
3. Directive Personnel	12.2	13.0	13.2	11.4	11.8
4. Fringe Costs	3.0	1.9	2.6	5.5	2.2
5. Manufacturing Supplies	10.5	18.5	19.0	16.5	19.2
6. Repairs and Maintenance	4.8	2.3	3.7	6.3	4.3
7. Depreciation	1.1	3.9	3.4	3.5	2.2
8. Rent	3.3	2.6	3.5	2.0	2.4
9. Advertising and Promotion	1.9	1.7	1.0	1.1	2.3
10. Insurance	2.2	1.1	1.3	1.5	2.0
11. Fuel	1.5	1.9	2.9	1.2	1.6
12. Electricity	2.2	2.2	2.9	2.0	1.9
13. Water Expense	0.5	0.8	0.9	0.8	0.8
14. Truck Expense	2.0	1.2	1.9	0.4	1.4
15. Telephone	0.4	0.5	0.4	0.6	0.5
16. Taxes	1.3	1.5	1.9	2.4	1.5
17. Office Supplies	1.0	0.6	0.3	0.4	0.3
18. Miscellaneous Expense	1.0	2.8	1.9	9.0	1.8
19. Bad Debts	0.5	0.1	0.1		0.2
20. Profit or Loss before taxes	20.9	7.1	1.5	Loss 2.0	3.2

*Presented at the 42nd Annual AES Convention, Cleveland, Ohio. The discussion following the presentation is not included here but will be found in the "Annual Technical Proceedings of the AES, 1955."

†Art Metal Finishing Co., Washington, D. C.

to be expected that some companies will have various expenses considerably out of line with the average. For instance, a shop doing industrial silver and gold plating only, would have a figure for manufacturing supplies that would probably exceed the cost of direct labor. This shop would still find the results of this survey valuable by making allowance for its special conditions and then checking the other costs against the average. By doing this, one becomes more conscious of the amount that so-called minor expenses add to the total cost of operation.

One word of warning concerning the results of this survey. There are no easy answers or magic formulae contained therein. They are averages and as such are simply guides. Only if the averages are used as a tool and not a goal will they be of value.

If you will refer to the copies of the survey, you will see that the expenses have been divided into nineteen categories. The first four items deal with wages and salaries, which in most cases are by far the largest expense.

1. Direct labor is the time spent by productive employees for buffing, racking, plating, pickling, spraying, dipping, or any portion of actual processing.

2. Indirect labor would cover checking, packing, truck drivers, inspectors, shop clerks, watchmen, and other necessary items which cannot reasonably be charged to any one order. In shops where some of this work is done by normally productive employees, it is essential that time thus spent be separated from the direct labor so that it will be prorated over all orders and not be charged to the first or last order of each day.

3. Directive personnel needs no explanation except that unincorporated companies should include a reasonable salary for the owner to bring this category and the profit into realistic comparison with the figures of an incorporated company.

4. Fringe costs are a recent addition to the cost of doing business and cover such items as paid holidays, vacations, wash-up time, hospitalization, and sickness benefits, to name a few. These become quite expensive. If you grant six paid holidays, one week vacation, and fifteen minutes wash-up time, an employee whose basic hourly rate is $2.00 will cost you $2.16 for each hour he works provided he loses no other time. Because these costs are more or less fixed, he would cost you even more per hour if he loses additional time.

5. Manufacturing supplies would cover the cost of anodes, chemicals, buffs, buffing compounds, enamels, lacquers, and all materials consumed in processing.

6. Repairs and maintenance would cover the cost of outside contracts for plumbing, electrical repairs, steamfitters, building repairs, and minor alterations not capitalized. The larger shops which have a maintenance crew would include their wages plus cost of parts purchased in this category. Truck repairs would not be included.

7. Depreciation is a very important item which is all too often overlooked by the very small company. This oversight takes about five years to become all too apparent.

8. Rent is obvious to those who pay it. The company which owns its own building should include as rent expense depreciation on building, interest on any indebtedness, real estate taxes, and repairs which are not capitalized.

9. Advertising and promotion should include the salary and expenses of salesmen, the cost of ads in newspapers, magazines, and telephone directory, the cost of printed brochures, and postage for same.

10. Insurance would cover all forms except Social Security taxes.

11, 12, and 13. Fuel, electricity, and water expenses need no explanation.

14. Truck expense would include gas, oil, tires, depreciation, and repairs, but not the wages of drivers.

FORM No. 1

XYZ Co.

Order No..... LABOR RECORD

Qnty.	Description

Instructions	No.	Hrs.	Min.
Repairing			
Plating			
Buffing			
Painting			
Total			

FORM No. 2

Name..... Date.....

Order No.	Start	Stop	Hrs.	Min.

15. Telephone expense would include the cost of service only and not the directory ad.

16. Taxes would include City, County, State, Unemployment, Sales, Gross Income, FICA, and all other except those on building and profits.

17. Office supplies would include all printed matter and postage not used for advertising and all other items normally used in the office.

18. Miscellaneous expense account is the catchall for all minor items that do not fit any of the preceding categories such as traveling expense, legal and audit, association dues, interest, and donations.

19. Bad debts or reserve for same is an ever present item, even in the best of times. If you are so fortunate as to have no losses of this type at present, it would be prudent to anticipate future probabilities by setting up reserves.

If the total of all the preceding nineteen items does not exceed your sales you have a profit which, despite some opinions to the contrary, is the principal reason you are in business.

Now we have listed all of our operating expenses and have accurately figured the percentage of each compared to sales. What good is it? It is ancient history unless we can use it today, tomorrow, and for some time to come.

It would be a very onerous task to keep a record of all these expenses on each and every order, but it would not be too difficult or expensive to accurately record the one which would best represent the total cost. Having reduced all the expenses to a percentage figure, we have established the relationship of any one to all the others.

The cost of direct labor would seem to be the best yardstick to use. All other costs are either fixed or will vary in direct proportion to the number of hours of direct labor expended.

The cost of direct labor can be readily determined by a very simple and inexpensive method of recording the time spent on each order by production employees. Two printed forms are all that is necessary. Form number one is a labor record which can also be a shop order. On this form space is provided to list the number and description of the articles to be processed. The lower half is divided into several sections to provide a space for each department, such as polishing, plating, and lacquering. These sections are divided into three columns, one is for instructions, one for the employee's clock number, and the other for his time. This time, multiplied by an appropriate factor will give a reasonably accurate check on the cost of any individual order, large or small. The most accurate factor would be one based on actual wages paid for direct labor. For instance, if a particular company, after making allowance for some special conditions in its type of business, determined that the cost of direct labor should be 27.5 per cent of sales instead of the industry average of about 30 per cent, it would divide the actual cost of direct labor by 27.5 per cent to arrive at the proper selling price. An even more simple method is to use a dollar figure and multiply it by the hours expended on each order. The dollar figure can be readily determined by adding together the hourly wages of all productive employees and dividing by the total number of such employees to get an average. This average when divided by the percentage of direct labor cost, which will yield a profit, will give you the number of dollars and cents that should be charged for each hour spent on a given order. While this method is less accurate, it has the virtue of being extremely rapid and simple, which is very attractive when you have a multiplicity of small orders.

As an example of these two methods, let us calculate the price that should be charged for a hypothetical order. On this order buffer A, at $2.25 per hour, spent eight hours; buffer B, at the same rate, spent eight hours, and buffer C, at $2.50 per hour, spent six hours. A racker, at $1.25 per hour; a plater, at $2.50 per hour, and a helper, at $1.50 per hour, finished the job in seven hours. On the basis of actual cost of direct labor we have a total of $87.75, which divided by 27.5 per cent is $319. On the basis of the more simple method we have a total of forty-three hours. Assuming that the employees mentioned are the total productive force, we find that the average cost per hour for direct labor is $2.04. To get our dollar figure we divide $2.04 by 27.5 per cent which is $7.42 per hour. Because this figure is to be used for calculating the price for small orders, we would probably round it off to $7.50 per hour. Applying it to our hypothetical order we find that forty-three hours multiplied by $7.50 equals $322.50.

Form number two is a daily record card for each employee. It is simply a card with four columns and a sufficient number of lines to allow space for every order an employee may work on in one day. In column one we place the order number; column two is for time started; column three is time finished; and column four is the elapsed time. While this form might seem to be superfluous, it is very necessary because it provides a record for the entire day, and the total of the time spent on all the orders must equal the working day. Without such a check you would probably have only one-half to three-quarters of the day accounted for. When it is necessary for a productive employee to do non-productive work, this can be noted on form two and will thus provide a record which will be useful in controlling unproductive time.

Neither of these formulae are of much value for estimating a price in advance, but estimating itself is a large subject. However, either method will serve to check the accuracy of each individual estimate, and to enable you to alter your estimating practices very rapidly, if necessary.

It would be very unwise to assume that the ideas suggested above are infallible and will eliminate the need of judgment in their application. They will provide some basic information without which so-called judgment is pure guesswork.

In conclusion, the author wishes to express appreciation to the National Association of Metal Finishers for supplying all of the data for this paper.

ARTHUR G. PIERDON

Pierdon

Employed by the Art Metal Finishing Company of Washington, D. C., since 1923. President of the Company since 1945.

He is a Charter Member of the Baltimore Washington Branch of the AES and has served two terms as Branch President. He served three years as Treasurer of the National Association of Metal Finishers and is now a Director of that organization. He is also a member of the Electrochemical Society, Washington Board of Trade, and Greater Washington Industrial Council.

His job as General Chairman is a big one. With the able assistance of his Executive Committee, he has everything well in hand and is well on the way to achieving his modest ambition of making the 1956 Convention the best ever.

DIFFUSED NICKEL CADMIUM AS A CORROSION PREVENTIVE PLATE FOR JET ENGINE PARTS*

By R. W. Moeller and W. A. Snell†

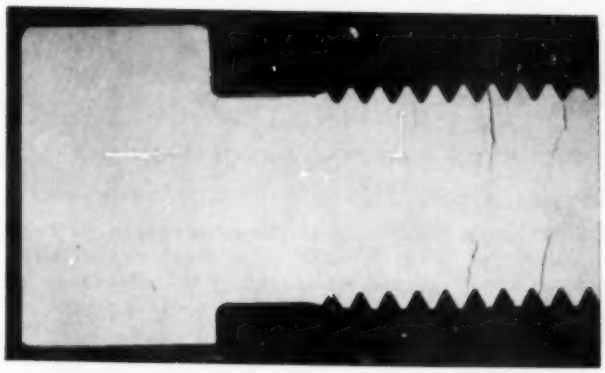


Fig. 1 Section Through Ihdium Plated AMS 6322 steel bolt showing stress-alloying cracks after heating two hours at 825 F. under 170,000 psi stress. Unetched. Mag. 10X

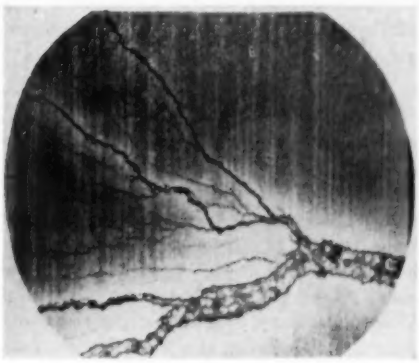


Fig. 2 Section Through Cadmium Dipped AMS 6322 steel bolt showing stress-alloying cracks after heating two hours at 825 F. under stress of 190,000 psi. Note presence of cadmium in widest crack. Etchant: 2 per cent Nital. Mag. 100X

ABSTRACT

The engineering application on a production scale of 0.0003 inch nickel plus 0.0001 inch cadmium, diffused at 630° F, is described as a corrosion preventive plate for low alloy steel parts which operate in jet engines at temperatures up to 1000° F.

INTRODUCTION

Corrosion protection of low alloy steel parts used in jet engines in locations where temperatures up to 1000° F are expected may be divided into two categories:

(1) the lower temperature range (maximum 550° F) where the problem of a thin coating with good corrosion resistance is solved by the use of electroplated cadmium, and

(2) the range beyond this maximum in which cadmium becomes inadvisable as its melting point (611° F) is approached. Coupled with the detrimental loss in corrosion resistance is the greater danger of risk of failure in hardened parts due to intergranular penetration and alloying of cadmium with the highly stressed base metal.

Since dimensional restrictions precluded the use of heavy plates of higher melting point materials such as nickel, the combination of a thin coating of nickel and cadmium apparently offered the most promising prospect of adequate corrosion protection without the danger of stress-alloying failure of the steel. Selection of the optimum nickel-cadmium ratio within the dimensional, corrosion, and stress-alloying restrictions and development of the resultant process on a routine production basis define the scope of this paper.

TEST RESULTS

GENERAL

The test program was directed to secure adequate corrosion resistance with 0.0003–0.0005 inch of protective plate, since dimensional requirements restricted the allowable thickness of plate on significant areas to 0.0005 inch, maximum.

Zinc, cadmium, or tin alone were eliminated for the 500–1000° F application by their tendency toward stress-alloying, which results when a molten metal penetrates the highly stressed steel base intergranularly, causing cracks or brittle failure. Figure 1 depicts the cracking which occurred as an indium plated bolt under high stress was heated above the melting point of the plate. Figure 2 shows the presence of cadmium in the crack which developed when a cadmium-

*Presented at the 42nd Annual AES Convention, Cleveland, Ohio. The discussion following the presentation is not included here but will be be found in the "Annual Technical Proceedings of the AES, 1955."

†Materials Development Laboratory, Pratt and Whitney Aircraft

dipped AMS 6322 steel bolt was heated at 825° F while being stressed at 190,000 psi.

Chromium plate showed inadequate corrosion resistance at the specified thickness and was considered unsuitable where uniform plating of complex shapes was required.

Electroplated nickel in the 0.0003–0.0005 inch range failed to meet corrosion resistance requirements, probably due to porosity extending through the plate. In early tests, nickel deposited by chemical reduction (electroless nickel) failed to pass the specified corrosion resistance requirements; recent tests have shown more satisfactory corrosion resistance, but tendency toward considerable reduction in fatigue strength of hardened base metal has retarded its acceptance as the basis of diffused nickel-cadmium plate.

A composite plate of nickel-zinc (U. S. Patent 2,315,740) gave generally good corrosion protection, although somewhat inferior to nickel-cadmium. Nickel-zinc plated panels, heated and then exposed to salt spray, produced large quantities of white corrosion salts, whereas only small quantities of salts formed on diffused nickel-cadmium plate.

NICKEL-CADMIUM PLATE

When nickel-cadmium was selected as the most promising combination to produce the required corrosion resistance, various plate thickness ratios within the 0.0005 inch maximum total thickness were tested to determine the optimum corrosion resistance consistent with freedom from stress-alloying. From these results it was determined that 0.00005 inch or more nickel would prevent stress-alloying of cadmium.

Corrosion resistance tests established the fact that 0.0003 inch nickel plus 0.0001 inch cadmium, diffused at 630° F for one hour, could withstand 100 hours salt spray without rusting, even if subjected to 23 hours at 700° F and one hour at 1000° F prior to exposure.

DISCUSSION

Development of a thin electroplate to impart corrosion protection to jet engine parts includes the use of nickel and cadmium—two plates which are familiar to most specification electroplaters. However, the particular requirement to which the combination of nickel and cadmium is being adapted makes certain specialized considerations necessary.

It has been shown that by selection of a low stress industrial type nickel solution and a suitable cadmium solution, with continuous operational control of solutions and processing, the electroplater can produce a plate which meets the corrosion resistance requirements of proposed AMS 2416. The application requires, in addition, that the electroplater heed the design characteristics of the plate to insure that not only the gain in corrosion resistance is preserved, but also that possible detriment due to stress-alloying is avoided.

To accomplish this, the electroplater must bear in mind the engineering application, i.e., a uniform nickel plate of high quality applied to parts which will operate under high stress at high temperature. Cadmium and the nickel-cadmium diffusion process are essential in maintaining conformance to the stringent corrosion resistance requirements, but the importance of the diffusion bake is underlined by the need to oxidize any free cadmium present. As the part is placed under operational stress and temperature, the presence of free cadmium is undesirable, particularly if in direct contact with bare steel. Since the throwing power of nickel plating solutions is less than that of cadmium solutions, additional effort will be required to insure adequate nickel thickness as well as to prevent plating of cadmium on bare steel areas.

PRODUCTION PLATING TO PROPOSED AMS 2416

GENERAL

Several years' experience in plating various engine parts of complicated shape with diffused nickel-cadmium on a production basis has indicated that the requirements of proposed AMS 2416 can be met consistently if special precautions are observed.

Primarily these concern the maintenance of sufficient analytical and operational control to produce an even, pit-free, completely continuous deposit of 0.0002–0.0004 inch nickel, followed directly thereafter by an even plate of 0.0001–0.0002 inch cadmium restricted to nickel plated areas only. After cadmium plate the parts are treated in a chromate conversion solution to minimize fingerprinting and staining which may appear after the diffusion period of one hour at 630° F.

PLATING SOLUTIONS

To date only nickel which meets the requirements of AMS 2403 has been used, limiting the nickel solution to chloride or sulfate-chloride baths containing no organic addition agents. AMS 2416 will also allow the use of other nickel solutions capable of producing satisfactory low stress plates which can operate at high temperatures without embrittling effects. Nickel plated from the sulfamate bath (without the additives necessary to create compressive stress) is showing promise of meeting the prescribed requirements.

Cadmium deposited from the cyanide bath to the requirements of AMS 2400 has been used satisfactorily. To prevent a stained and fingerprinted appearance, the cadmium plate is treated by immersion in chromate conversion solution before the heat treatment to accomplish diffusion of the nickel and cadmium.

ELECTROPLATING STRESS

Since highly stressed parts are involved, it is essential that tensile stresses induced by protective plates be kept to a minimum. Selection of a low stress solution, systematic purification, and stress relief by baking after plating serve to maintain this figure below a prescribed maximum. Preferably this figure should be below 25,000 psi.

Stress measurements of nickel as plated are made conveniently by spiral contractometer,[1] while the relationship between as-plated and as-baked stress may be determined by a beam curvature method.[2]

PLATING FIXTURES

A system of conforming anodes and thieves is necessary to produce a regulated deposit on intricately shaped parts. Figures 3 through 7 show such fixtures used on various jet engine parts. Anodes fabricated of Grade A nickel using nickel welds are used for both nickel and cadmium plating.

[1] A Brenner and S. Senderoff, Proc. Amer. Elec. Soc. 35, 53 (1948).

[2] L. H. Corkin and R. W. Moeller, Plating 41, 1154 (1954).

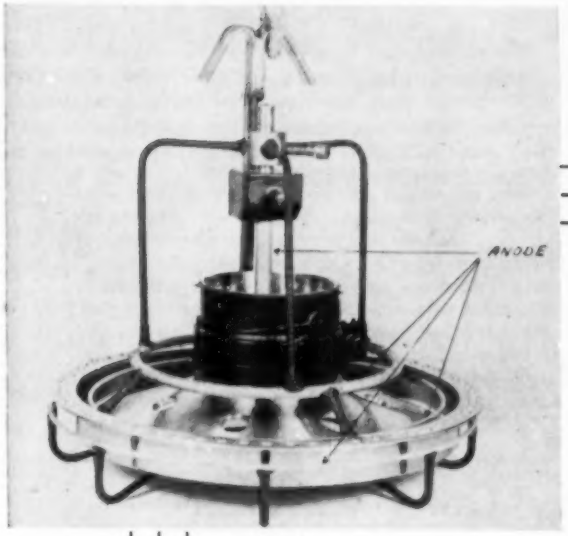


Fig. 3

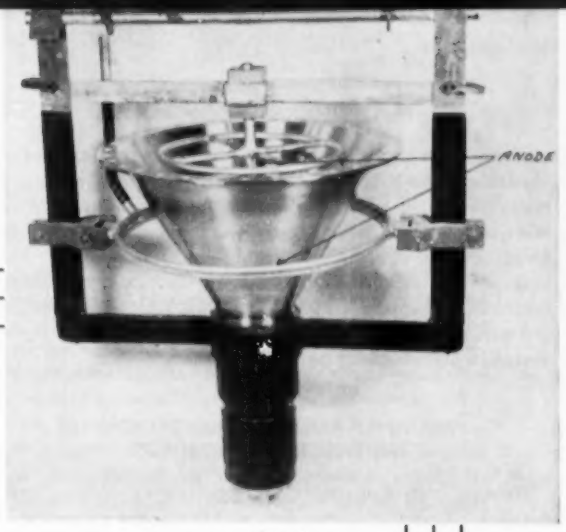


Fig. 4

Figs. 3, 4, 5, 6, 7. Jet Engine Parts With Attached Fixtures Used In Plating Nickel and Cadmium to Proposed AMS 2416

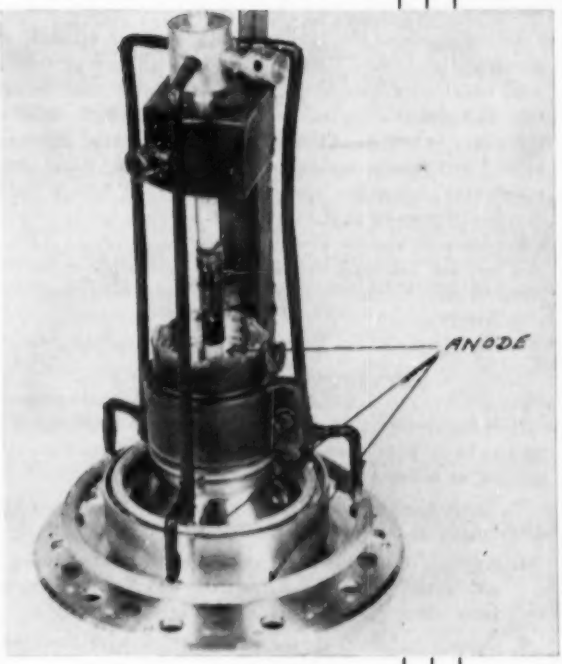


Fig. 5

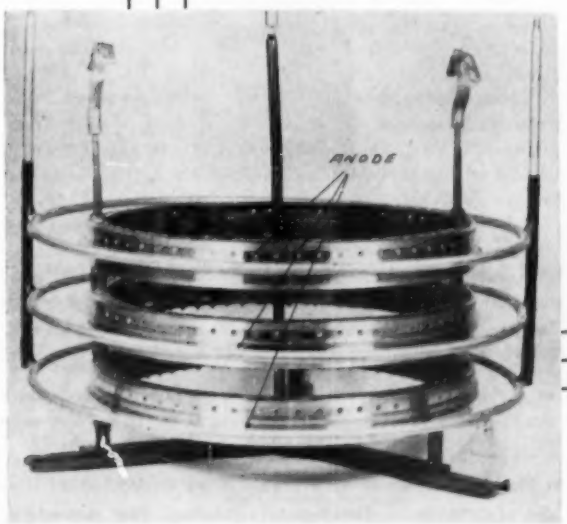


Fig. 6

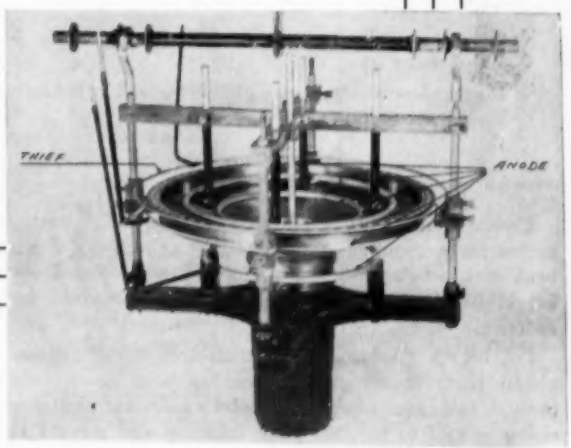


Fig. 7

PLATE THICKNESS CONTROL

Since there is no satisfactory nondestructive method of thickness measurement of the final nickel-cadmium plate on many parts, it is necessary to interrupt the plating sequence after nickel plate for magnetic or other suitable measurement. Plating of cadmium should follow immediately. This may be controlled by regulation of deposition rate determined on test specimens and checked occasionally by weight per unit area measurement of cadmium stripped from representative parts without previous diffusion.

QUALITY CONTROL—CORROSION RESISTANCE REQUIREMENTS

Routine control of plate quality by proper solution maintenance, processing supervision, and in-process inspection of plates is required to insure acceptable parts, but particular emphasis is necessary to meet the stringent corrosion resistance requirements.

In order to pass the 100 hour salt spray test without corrosion of the diffused 0.0002–0.0004 inch nickel plus 0.0001-0002 inch cadmium coating, the electroplater must be certain that distribution insures at least 0.0002 inch nickel at the center as well as at the edges of the test panel. Surface-ground test panels of low alloy steel will be found most satisfactory, but other panels of smooth stock free of inclusion or pits may be used. Care must be taken not to remove a considerable amount of cadmium in the chromate conversion solution following cadmium plate, since prolonged immersion may prevent conformance to corrosion resistance requirements.

PRECAUTIONS—FREE CADMIUM

It is imperative that no free cadmium be available in a jet engine in locations where highly stressed parts are operating at or above the melting point of cadmium.

To insure the absence of cadmium on bare steel areas, the electroplater should observe the following precautions:

1. Regulate the process of nickel deposition to secure a satisfactory deposit of at least 0.00005 inch nickel in all areas where nickel-cadmium plate is required.
2. Deposit cadmium only on areas which have been previously nickel plated.
3. Diffuse all parts at 630F for one hour prior to engine use.
4. Prevent transfer of cadmium from plating hooks, fixtures, etc.
4. Reject plate which shows "balled" cadmium, indicating inadequate diffusion.

CONCLUSIONS

Corrosion resistance requirements on low alloy steel jet engine parts operating at temperatures up ot 1000° F have been met satisfactorily by a diffused electroplated coating of 0.0002–0.0004 inch nickel plus 0.0001–0.0002 inch cadmium.

Continuous production of satisfactory nickel-cadmium plated parts of complex shapes has been accomplished through the use of conforming nickel anodes and rigid processing control to regulate plate thickness and prevent the presence of free cadmium.

ACKNOWLEDGMENTS

The authors wish to acknowledge the cooperation of the Metallurgical and Mechanical Testing Divisions of the Pratt & Whitney Aircraft Materials Development Laboratory for metallurgical analysis and fatigue testing respectively and of the Production Engineering and Plating Departments for aid in graphic presentation of fixtures.

R. W. MOELLER

Ralph W. Moeller was born in Middletown, Conn., in 1916. He received a BA degree with distinction in Chemistry from Wesleyan University in 1938, then spent two years as a lacquer chemist with Stanley Chemical Co.

After entering the employ of Pratt & Whitney Aircraft in 1940, he worked for nearly two years in materials control, then joined a newly formed group which became the Materials Development Laboratory.

He is now Supervisor of Electrochemical Development in the Materials Development Laboratory. He lives in Durham Center, Conn., with his wife and two sons.

W. A. SNELL

William A. Snell was born in Sturbridge, Mass., in 1908, and received his BS degree in Chemistry from Worcester Polytechnic Institute in 1932.

He was with E. I. du Pont, Rayon Division at Richmond, Va., as a chemist for six years, and has been with Pratt & Whitney Aircraft since 1941 except for two years in the U. S. Navy as an aerographer.

He is at present a research chemist in the Electrochemical Division of the Materials Development Laboratory. His home address is Hebron, Conn.

STUDY OF COPPER ANODES IN ACID AND CYANIDE PLATING BATHS*

By WILLIAM H. SAFRANEK and DR. CHARLES L. FAUST†

INTRODUCTION

For several years after high-efficiency copper cyanide baths were introduced, electrolytic copper was preferred for anodes.[1] The electrolytic copper then was the only high-purity metal supplied by reliable sources.

High-purity cast anodes (OFHC)[2] became available about two years ago, overcoming the disadvantage of the electrolytic copper with respect to fastening hooks. The cast annodes dissolve uniformly, thus, creating less scrap than electrolytic copper. Furthermore, the high-purity cast anodes are supplied in lengths up to 90 inches, whereas electrolytic copper slabs are only 36 inches long. Most anodes used for plating need to be longer than 36 inches.

More than two million pounds of the high-purity castings have been used for copper plating since they were introduced. Several users have reported better results with the new cast form, by comparison with electrolytic copper. Particle roughness has been reduced. As a result, diaphragms have been eliminated in some installations.

The high-purity cast anodes were compared with electrolytic copper and with other types of anodes in laboratory and pilot-plant baths to provide information needed for commercial operation. This report deals with the laboratory and pilot-plant data.

DENSITY AND PURITY OF ANODES

The density, purity, and grain size of the anodes included in this study are listed in Table I. The impurity contents given in Table II were the basis for calculating the purity, in accordance with the customary procedure for such an estimation.

The oxygen-free anodes and the rolled bars were denser than the electrolytic copper or the conventional castings. The porosity in the electrolytic and the conventional cast copper is associated with irregular dissolution in copper-plating baths, leading to the formation of small anode particles that contribute to "shelf" roughness in copper electroplates.

The oxygen-free anodes were the purest among the eight forms of copper investigated. The metallic impurity contents of the oxygen-free cast and forged anodes were as low as the metallic impurities in either of the two electrolytic grades. The experimental oxygen-free anodes with a low-sulfur content contained less metallic impurities than the electrolytic copper.

A set of OFHC brand copper anodes containing 0.019 per cent phosphorus was included in this study in view of the favorable results reported a year ago on the effect of adding phosphorus to cast copper anodes used in copper-sulfate baths.‡ Except for the deliberate phosphorus addition (added as phosphor copper), the purity of this set of anodes was equal to the purity of the commercial, oxygen-free anodes.

The reverse-electrolysis copper is produced by reversing the current for a short time after the starting cathodes are immersed in the electrorefining cells in order to improve the adherence of the subsequent cathode deposit on the starting sheets. As a result of this procedure, reverse-electrolysis copper does not separate into two layers, as ordinary electrolytic copper does during use in copper electroplating baths.

Grain size was determined by measuring the dimensions of grains in representative longitudinal and transverse sections, after polishing and etching in accordance with customary metallographic techniques. The results of this study confirm previous indications that grain size, per se, does not influence the behavior of copper anodes.

ANODE PERFORMANCE IN HIGH-EFFICIENCY POTASSIUM CYANIDE SOLUTION WITH NO ADDITION AGENTS

Each of the anodes listed in Table I was evaluated in a preliminary test in a high-efficiency potassium cyanide bath containing no addition agents, except Rochelle salts. The formulation of this solution and the operating conditions are summarized in Tables III and IV. The cathodes were flat panels with the bottom half-inch bent out on a horizontal plane, forming a shelf. No diaphragms separated the anodes from the cathodes. Plating solution was filtered into the plating tanks but was not filtered subsequently. The mechanical impellers supplied agitation at both the cathodes and the anodes.

With the oxygen-free cast and forged anodes, copper plates, averaging about 0.0005 inch thick, contained very few

TABLE I. DENSITY, PURITY, AND GRAIN SIZE OF COPPER ANODES

Anode	Density, g/cc	Purity, per cent copper	Grain Size, cu mm
Oxygen-free, cast billets	8.93	99.99+	10
Oxygen-free, forged bars	8.94	99.99+	0.1
Experimental, low-sulfur oxygen-free billets	8.96	99.99+	40
Experimental, oxygen-free billets with phosphorus added	8.91	99.97	0.01
Reverse-electrolysis copper	8.92	99.98	0.001
Conventional electrolytic copper	8.96	99.97	0.01
Rolled bars	8.93	99.94	0.0001
Conventional cast bars	8.34	99.9	10

*Presented at the 42nd Annual AES Convention, Cleveland, Ohio. The discussion following the presentation is not included here, but will be found in the "Annual Technical Proceedings of the AES of 1955."

†Battelle Memorial Institute, Columbus, Ohio.

‡Nevers, R. P., Hungerford, R. L., and Palmer, E. W., "Effect of Anode Composition in Acid Plating Baths," Proceedings, American Electroplaters' Society 41, (1954).

TABLE II. IMPURITY CONTENTS OF COPPER ANODES*

Anode	Silver	Iron	Sulfur	Lead	Tin	Antimony, per cent	Bismuth	Zinc	Manganese	Nickel	Phosphorus	Oxygen
Oxygen-free cast billets	0.0010	0.0010	0.0019†	0.0003	0.0001	<0.0005	<0.0001	<0.0003	<0.00005	0.0008	<0.0005	none
Oxygen-free forged bars	0.0010	0.0010	0.0019†	0.0003	0.0001	<0.0005	<0.0001	<0.0003	0.00005	0.0008	<0.0005	none
Experimental low-sulfur oxygen-free billets‡	0.0010	0.0004	0.0006†	0.0002	0.0001	<0.0005	<0.0001	<0.0003	0.00005	0.0004	<0.0003	none
Experimental, oxygen-free billets with phosphorus	0.0010	0.0008	0.0020†	0.0006	0.0002	<0.0005	<0.0001	<0.0003	0.00005	0.0006	0.019	none
Reverse Electrolysis copper	0.0007	none	0.0014§	0.0005	0.0001	<0.0005	<0.0001	<0.0003	0.00005	0.0003	none	not determined
Electrolytic copper			0.003§	0.0003	0.0001	<0.0005	<0.0001	<0.0003		0.0003	none	not determined
Rolled bars			0.0014§	0.0008	0.0001	0.0015	0.0001			0.0014	none	0.050
Conventional cast bars			0.0014§	0.0029	0.0020	0.0015	0.0001	0.0015		0.0025	none	0.074

*Data supplied by the Metallurgical Department of The American Metal Company, Limited.
†As sulfide.
‡Arsenic was 0.0001 per cent and tellurium was 0.0003 per cent.
§As sulfate.

or no nodules. Furthermore, the solutions remained clear and free of anode particles. Deposits produced with the reverse-electrolysis copper and the experimental phosphorized anodes consistently contained a few nodules. The conventional electrolytic copper and the experimental low-sulfur anodes contributed several nodules to each deposit. Very rough nodular deposits were obtained with the rolled and conventional cast bars.

Each anode was covered with a brown or black film within a few minutes after the current was started. When the operation was concluded, thick adherent films were evident on the conventional cast and the experimental phosphorized anodes. Thinner films were observed on the other anodes.

ANODE PERFORMANCE IN A POTASSIUM CYANIDE SOLUTION CONTAINING A WETTING AGENT

A high-efficiency potassium cyanide solution with a wetting agent was used in 15-gallon pilot-plant tanks, arranged in electrical series for evaluating the different anodes simultaneously. The formulation and conditions for this solution are summarized in Tables III and IV. The tanks were operated for 20 days (3600 ampere-hours) with direct current and for another 20 days (4120 ampere-hours) with the current reversed for one second after every five seconds of direct current. The steel tanks were lined with neoprene rubber and equipped with glass-sheathed electrical-resistance heaters. The cathode-bar agitation supplied very little or no agitation of the solution adjacent to the surface of the anodes. Four anodes, about 13 inches long, were placed in each tank. The submerged length was varied slightly to compensate for differences in circumference, equalizing the anode current density in each tank.

TABLE III. BATH FORMULATIONS OF COPPER CYANIDE BATHS

Constituent	Potassium Cyanide Bath With No Addition Agents	Potassium Cyanide Bath With a Wetting Agent	Sodium Cyanide Bath With Brighteners
Copper cyanide, g/l	60	85	75
Potassium or sodium cyanide, g/l	92	145	90
Free potassium or sodium cyanide, g/l	9	20 to 23	8 to 10
Potassium or sodium hydroxide, g/l	15	42	15
Rochelle salts, g/l	15	none	45
Wetting agent, g/l	none	3	none
Sodium sulfocyanide, g/l	none	15*	none
roprietary brighteners, per cent by volume	none	none	3

*Werulund, C. J., Benner, H. L., and Bair, R. R., U. S. Patent 2,287,654.

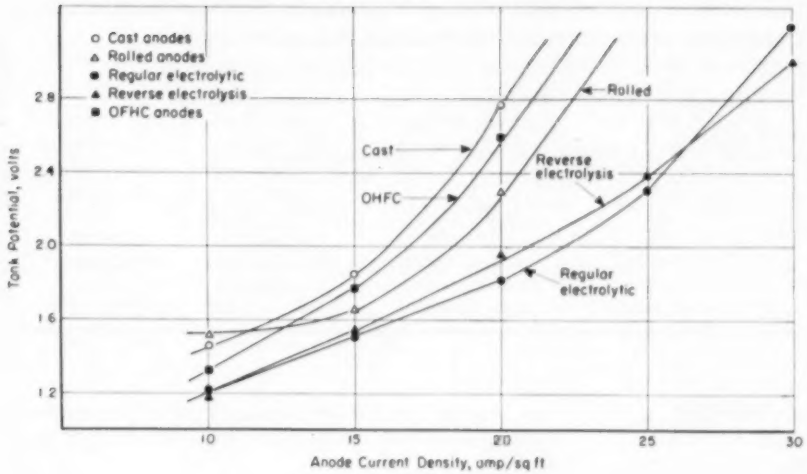


Figure 1

Relationship between tank potential and anode current density at approximately 170 to 176 F in a high-speed potassium cyanide bath with direct current

3.0 oz/gal Free Potassium Cyanide

Voltage data at increasing anode current densities with direct and PR current are given in Figures 1 and 2. A slightly lower voltage was observed for the electrolytic copper anodes relative to other anodes. However, the depolarizing influence of the periodic current reversal has more significance. Anodes that began to polarize at about 20 amp/sq ft with direct current showed no tendency to polarize with PR current until the current density exceeded 30 amp/sq ft.

After the voltage measurements, the baths were operated steadily with an anode current density of 15 to 20 amp/sq ft, simulating commercial conditions. Potassium cyanide additions were made once or twice a week to adjust the free cyanide concentration to 23 g/l. Supplementary wetting agent (2 g/l) was added to each bath after a few days of operation to reduce the surface tension to 35 dynes/cm. The solution was not filtered after it was initially prepared and filtered into each plating tank. No diaphragms were used.

Electroplates, about 0.0005 inch thick, were deposited at least once a day on buffed die castings cleaned and plated in a low-efficiency "strike" bath according to the customary procedure. At other times, steel panels were plated after cleaning and striking. The thickness of such plate usually was about 0.001 inch, but thicker plates were deposited at regular intervals. The plates on the die castings were consistently bright and smooth. A very few nodules generally were observed in the thicker deposits on the steel. However, all the plates were about equal in smoothness with the agitation conditions used in this study. No significant difference in ductility was detected by bend tests. PR current showed no tendency to improve the smoothness of the thick deposits.

Anode efficiency and sludging data are given in Table V. With PR current, the anode current efficiency for all anodes was more than 100 per cent. With direct current, only the electrolytic copper dissolved with an anode efficiency exceeding 100 per cent.

Operation with direct current caused more anode sludge than operation with PR current. Thus, PR must assist the dissolution of copper oxide that tends to sludge out on the anode as a result of depletion of free cyanide in the anode film. Any undissolved copper particles that became detached from the anodes during operation evidently were carried down with the sludge, because only very few nodules were evident on the cathode deposits. If the solutions had been agitated more, roughness might have nucleated either from undissolved copper particles or undissolved oxide particles.

Copper, iron, lead, and magnesium were identified in the sludge from each tank. Other trace impurities, including silver, zinc, and nickel, evidently were completely dissolved in the bath.

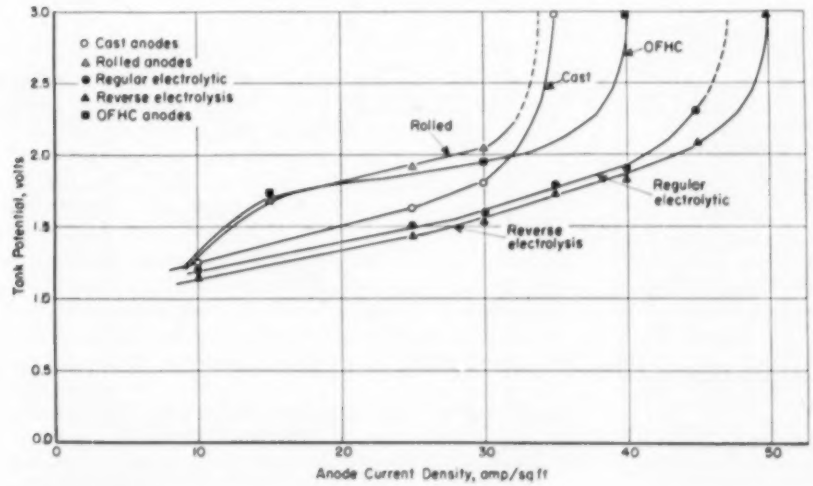


Figure 2

Relationship between tank potential and anode current density at 175 F to 180 F in potassium cyanide bath with the current periodically reversed

TABLE IV. OPERATING CONDITIONS FOR COPPER-PLATING BATHS

Condition	Potassium Cyanide Bath With No Addition Agents	Potassium Cyanide Bath With a Wetting Agent	Sodium Cyanide Bath With Brighteners	Copper Sulfate
Temperature, F	145	175	165	85 to 100
Cathode current density, amp/sq ft	40	20 to 40	30 to 45	75
Anode current density, amp/sq ft	70	15 to 20	15 and 75	40 to 100
Agitation	Mechanical impeller	2-inch stroke work bar: 20 cpm	Work bar plus air agitation	Air agitation*
Thickness of plate, inch	About 0.0005	0.0005 to 0.005	0.0005 to 0.005	0.001 to 0.010

*3.5 cu ft/hour/sq ft of solution surface area.

ANODE PERFORMANCE IN AIR-AGITATED SODIUM CYANIDE BATHS

Sodium cyanide baths with the formulation given in Table III were agitated with air, chiefly to supply the turbulence necessary for producing bright plate with the proprietary brighteners at hand. The anode current density was increased from 20 to 80 amp/sq ft with no evidence of anode polarization. The voltage data are shown in Figure 3. Only the phosphorized anodes acquired an anode film. The other anodes remained clean at all times.

Steady operation of 15-gallon baths for 22 days (2400 ampere-hours) with an anode current density of 15 to 20 amp/sq ft caused roughening of the surface of all anodes. Very small copper particles could be detached from many of the anodes by rubbing their surface with a knife edge. Such particles evidently caused the nodules that were observed on many of the cathode electrodeposits. The electroplates were 0.0005 inch thick on zinc die castings and 0.001 inch thick on steel panels.

The smoothest plates were produced in the bath operated with the oxygen-free cast anodes. Very few or no nodules appeared on most of these plates. By comparison, many large and small nodules were evident on all of the plates obtained with the other anodes.

Only about 1 gram of sludge was filtered from each bath after dissolving more than 12 pounds of copper from the anodes by electrolytic operation. This sludge contained chiefly aluminum and calcium oxides, evidently introduced with the water used for bath volume makeup. This sludge evidently does not cause roughness, because smooth plate was produced in the bath equipped with the oxygen-free castings, despite the sludge suspended in the solution by the air agitation.

The nodules observed on the deposits obtained in the other baths are believed to have been caused by undissolved copper particles that became detached from the anodes. Preferential grain-boundary corrosion might be the cause for the uneven dissolution of the surface of the copper anodes.

With steady operation at an anode current density of 75 amp/sq ft, the smoothness of plates produced with any individual set of anodes was not consistent. However, fewer and smaller nodules usually were observed on deposits produced with the oxygen-free anodes, compared with the other electroplates. The forged oxygen-free anodes appeared to be the best anodes, with respect to particle roughness. The experimental low-sulfur, and commercial oxygen-free, cast anodes were nearly as good as the forged anodes. Electrolytic, rolled, conventional cast, and phosphorized anodes caused nodular deposits during a two-week operating period.

The results of operating the air-agitated sodium cyanide baths with both a high and a low anode current density are summarized in Table VI. In general, the plates obtained with an anode current density of 75 amp/sq ft were smoother than the deposits produced with an anode current density of 15 amp/sq ft. The anodes dissolved very smoothly at 75 amp/sq ft. Their surfaces were bright as well as smooth. Thus, anode dissolution was improved by increasing the current density in the air-agitated solution. This behavior may be the key to the development of very high-speed plating at a higher rate than that used commercially today.

The anode efficiency for all anodes at 75 amp/sq ft was

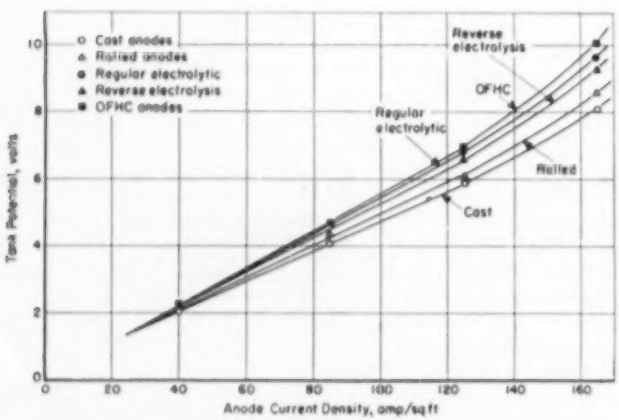


Figure 3. Relationship between tank potential on anode current density at 156F to 158F in air agitated sodium cyanide baths with a free cyanide concentration of 10 g/l (165F)

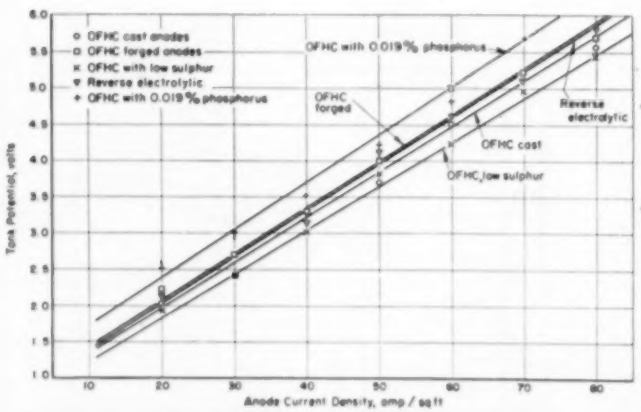


Figure 4. Relationship between tank potential and anode current density at 100F in copper sulfate-sulfuric acid electrolyte

TABLE V. ANODE EFFICIENCY AND SLUDGING DATA ON OPERATING POTASSIUM CYANIDE BATHS WITH OFHC, CAST, ROLLED, REGULAR-ELECTROLYTIC, AND REVERSE-ELECTROLYSIS ANODES

Anode	Anode Efficiency		Anode-Sludge Weight‡		Proportion Based on Anode Weight Loss		Condition of Anode Films	
	With Direct Current,* per cent	With PR Current,† per cent	With Direct Current, ounces	With PR Current, ounces	With Direct Current, per cent	With PR Current, per cent	With Direct Current	With PR Current
Commercial oxygen-free cast billets	100	106	6.0	0.4	1.8	0.10	Relatively thick red film	Very thin film
Conventional castings	100	108	10.0	0.4	2.9	0.10	Relatively thin dark-brown film	Relatively thin red-brown film
Rolled	100	105	2.6	0.3	0.8	0.08	Relatively thin dark-brown film	Relatively thin red-brown film
Regular electrolytic copper	108	104	3.1	0.9	0.9	0.25	Very thin brown film	Extremely thin red film
Reverse electrolysis copper	106	110	1.5	0.6	0.4	0.18	Very thin brown film	Extremely thin red film

*Based on an ampere-hour meter reading of 3600 ampere-hours.
†Based on an ampere-hour meter reading of 4120 ampere-hours.
‡Sludge dried in air for about 2 weeks.

about 110 per cent; at 15 amp/sq ft, it was 103 to 104 per cent. The consumption of sodium cyanide averaged 0.7 lb/1,000 ampere-hours, equivalent to about 0.25 lb of sodium cyanide/lb of copper dissolved from the anodes.

After operation with an anode current density of 15 amp/sq ft, and before increasing the anode current density to 75 amp/sq ft, the copper plating solution was contaminated accidentally with a very small amount of silver cyanide plating solution. The silver caused very rough deposits, until it was removed by dummy plating for about three hours. The results indicate that silver is a harmful impurity.

ANODE PERFORMANCE IN COPPER SULFATE PLATING BATHS

Five 15-gallon air-agitated copper sulfate baths were operated for 26 days (19,340 ampere-hours) to compare the oxygen-free cast anodes with rolled, reverse-electrolysis, conventional electrolytic, and conventional cast copper anodes. The solution was prepared with 188 g/l copper sulfate (25 oz/gal $CuSO_4.5H_2O$), 75 g/l sulfuric acid (10 oz/gal H_2SO_4) and 1.0 g/l phenol sulfonic acid. The solution was filtered into each tank but was not filtered thereafter. The temperature usually was maintained at 90 ± 5 F.

The relationship between the tank voltage and the anode current density is shown in Figure 4. With turbulent agitation of the solution adjacent to the anode surfaces, the anodes did not polarize appreciably when the current density was as high as 160 amp/sq ft.

Most of the time, six 13-inch long anodes were installed in each tank, giving an anode current density of 40 amp/sq ft before the surface area was decreased by dissolution. Table

TABLE VI. PERFORMANCE OF COPPER ANODES IN AIR-AGITATED HIGH-EFFICIENCY SODIUM CYANIDE BATHS

Anodes	Smoothness of Plate for Operation With a 15 amp/sq ft Anode Current Density	Smoothness of Plate for Operation With a 75 amp/sq ft Anode Current Density
Commercial, oxide-free cast billets	Relatively few small nodules	Relatively few small nodules
Oxide-free forged bars	Few or several	Very few small nodules
Experimental low-sulfur oxide-free billets	Many nodules	Relatively few small nodules
Experimental phosphorized oxide-free billets	Many nodules	Many nodules
Reverse-electrolysis copper	Very rough	Many nodules
Rolled bars	Few nodules	Several or many nodules
Conventional cast bars	Several nodules	Very rough
Regular electrolytic	Several nodules	Not evaluated

IV details the operating conditions. No anode bags or diaphragms were used.

The appearance of the anode films was influenced by the anode impurities. The films appeared as follows:

Anode	*Anode Film*
Oxygen-free cast billets	Light brown film of finely divided copper and/or copper oxide
Conventional cast ovals	Intermediate brown film of copper particles and/or copper oxide and impurities
Rolled bars	Heavy black film of copper particles and/or copper oxide and impurities
Regular electrolytic copper	Light brown film of finely divided copper and/or copper oxide
Reverse electrolysis copper	Light brown film of finely divided copper and/or copper oxide

The sludge from the anode film particles accumulated at the bottom of the tanks where it did no harm. The rolled and the conventional cast anodes produced the most sludge; the oxygen-free billets and the electrolytic anodes introduced less sludge. Sludge represents loss of copper that is not usable by the electroplater.

Despite the differences in the character of the anode films and the amounts of accumulated sludge, no major differences were observed in the smoothness or appearance of the cathode deposits. Plate about 0.001 inch thick was relatively smooth; 0.010-inch thick plate was consistently nodular.

The oxygen-free billets and the rolled bars dissolved with an efficiency of 101 per cent, so the copper concentration of solutions equipped with these anodes increased only very slightly. By comparison, the copper sulfate content of the other baths increased by 5 oz/gal or more during the time that about 50 lbs of copper was dissolved from the anodes, corresponding to a loss of between 2.6 and 4.2 per cent of the copper consumed by dissolution. The anode efficiencies were 103 per cent for conventional cast ovals, 102+ per cent for the regular electrolytic anodes, and 104 per cent for the reverse-electrolysis copper.

The oxygen-free anodes dissolved more uniformly than the other anodes, which were corroded more rapidly at the solution level than they were below it. Thus, the oxygen-free anodes created less scrap, as follows:

Anode	*Weight of Scrap, pounds*	*Per Cent Scrap, based on original weight*
Oxygen-free cast billets	5.25	10.5
Conventional cast ovals	10.0	13.9
Rolled bars	7.7	13.2
Regular electrolytic copper	8.4	14.9
Reverse-electrolysis copper	8.3	14.7

Only the oxygen-free anodes acquired an appreciable surface film in air-agitated copper sulfate solution containing a proprietary addition agent, a wetting agent, and 4 mg/l of hydrochloric acid. This film contained both copper oxide and undissolved copper particles. No film formed on the conventional cast bars or the electrolytic copper. A very thin film was seen on the rolled copper bars.

Rough copper electrodeposits were obtained in the bath with the conventional cast anodes. All of the deposits produced with the rolled anodes and the electrolytic copper anodes were nodular consistently. No nodules occurred by operating with the commercial-brand oxygen-free copper anodes. The thickness of each copper plate was between 0.001 and 0.0013 inch. The cathode current density was in the range of 75 to 100 amp/sq ft, and the anode current density was about 35 amp/sq ft.

ACKNOWLEDGMENTS

The authors acknowledge with appreciation the permission of The American Metal Company, Limited, and Battelle Memorial Institute to publish this paper.

WILLIAM H. SAFRANEK

Safranek

William H. Safranek is Assistant Chief of the Electrochemical Engineering Division at Battelle Memorial Institute, Columbus, Ohio. As such, he is closely associated with various research projects aimed at developing finishes for protection against corrosion and finding new methods for producing metals. He has been at the research center since 1945.

Previously, Safranek had gained industrial experience, working in electroplating at the Alemite Die Casting Company and Apollo Metal Works. He received a B.S. Degree in chemistry from the University of Chicago.

The Battelle scientist has authored or coauthored some 20 technical articles and chapters in books. He is active in the ASTM Committee B-8 on electrodeposited metals. He served as Chairman of the committee for the 1955 Tri-State Regional Meeting of AES in Columbus. Other technical groups with which Safranek is affiliated include the ACS and the ASM. He is a past president of the Columbus Branch of the AES.

DR. CHARLES L. FAUST

Faust

Dr. Charles L. Faust, a graduate chemical engineer, has been associated with the Battelle Memorial Institute since 1934, engaged primarily in electrochemical research. He is presently the head of the Institute's Electrochemical Engineering Division. This division's research activities deal largely with various aspects of metal finishing, electrowinning, electrorefining and extractive metallurgy, electrolysis and electrode processes, and waste disposal. The division has more recently been engaged in research on batteries.

In connection with his work, Dr. Faust has become associated with numerous technical and professional societies. As a member of the Electrochemical Society, he has held several high offices including the national presidency in 1950. He had previously been the Society's national vice president for three successive years. He was also a member of the Board of Directors from 1943 to 1945 and again from 1947 to 1951. Dr. Faust was associate editor of the AES publication from 1944 to 1949. It was known as the Monthly Review and later became Plating.

In addition to these affiliations, Dr. Faust is a member of the ACS, the Electrodepositors' Technical Society of London, Sigma Xi, Tau Beta Pi, Phi Lambda Upsilon, and Alpha Chi Sigma.

Dr. Faust has also written or coauthored over thirty technical articles, chapters in three books, and holds over thirty patents. His academic career include studying at St. Louis University, a B.S. and M.S. in chemical engineering from Washington University, and a Ph.D. from the University of Minnesota, also in chemical engineering.

HONITE Barrel Finishing Produces

Superfine Sanitary Finish!

Cherry-Burrell Corporation, Milwaukee Division, made large savings when they switched to the HONITE Barrel Finishing Method, *and* actually improved the sanitary finish necessary on their line of food processing equipment.

The milk filler tank shown below was formerly finished in two hand operations—grinding to remove weld splatter and generally improve the surface, and polishing to bring the surface down to 15 R.M.S. Recently, Methods Engineer, Ralph Wenger, supervised a change to the HONITE Barrel Finishing Method.

Results? The recommended HONITE procedure eliminated the polishing operation completely, and 60% of the rough grinding hand operation. Finishing time was cut 1½ hours . . . and finishes were improved to a superfine finish.

Your HONITE Methods Engineer or nearby HONITE distributor will show you how *you* can increase production and cut costs, too. Call him today!

Remember, too, the HONITE Division of the 3M Company supplies a *complete line* of abrasive chips, compounds and equipment for every barrel finishing need.

CHERRY-BURRELL METHODS ENGINEER, Ralph Wenger, holds a 40 lb. stainless steel milk filler tank. HONITE Barrel Finishing Method produced its superfine finish.

Honite BRAND

IT'S NEW!

Made in U.S.A. by Minnesota Mining and Mfg. Co., General Offices: St. Paul 6, Minn. In Canada: P. O. Box 757, London, Ontario. Export Sales Office: 99 Park Ave., New York City. Makers of "SCOTCH" Pressure-Sensitive Tapes, "SCOTCH" Brand Magnetic Tape, "3M" Adhesives, "Underseal" Rubberized Coating, "Scotchlite" Reflective Sheeting, "Safety-Walk" Non-slip Surfacing.

MINNESOTA MINING AND MFG. CO.
DEPT. FC-125, ST. PAUL 6, MINN.

☐ *Send me FREE copy of "Facts and Figures Report on HONITE Barrel Finishing"*

☐ *I'd like to talk with a HONITE Field Engineer*

Name ..... *Title* .....

Company .....

Address .....

City ..... *Zone* ... *State* .....

Type of product to be finished .....

PATENT ABSTRACTS

DR. D. GARDNER FOULKE
Manager, Electrochemical Development
Hanson-Van Winkle-Munning Co.
Matawan, New Jersey

Copies of patents may be obtained by writing to Commissioner of Patents, Washington, D. C. Price 25 cents each.

No. 2,650,875, September 1, 1953—Method of Etching Aluminum—V. Dvorkovitz and J. Swihart, assignor to The Diversey Corp.

The addition of a water soluble polyhydroxy organic compound to alkaline aluminum etching solutions is claimed to prevent scale formation. The organic compound is selected from the class consisting of polyhydric alcohols of the formula

$$CH_2OH(CHOH)_a\ CH_2OH$$

where a is at least 2, starches of the formula $(C_6H_{10}O_5)_x$, polyhydroxy monobasic acids of the formula

$$COOH(CHOH)_c\ CH_2OH$$

where c is at least 4, polyhydroxy dibasic acids of the formula

$$COOH(CHOH)_4\ COOH$$

where d is at least 3 and gum arabic.

11 claims. —AES—

No. 2,708,181, May 10, 1955—Electroplating Process—A. Holmes & Burns, assignors to Indiana Steel & Wire Co., Inc., Indiana.

The invention describes contactors to be used under solution level. The contactor should be made of at least one metal from the group of tungsten, molybdenum, tantalum, columbium, zirconium and hafnium. The disclosure points out that treeing does not occur on such contactors, the moving work strip or wire keeping the contactors essentially clean.

9 claims, 3 figures. —AES—

No. 2,708,184, May 10, 1955—Tincture of Iodine as Acid Pickling Inhibitor—K. Hager and M. Rosenthal, assignors to the United States of America (Army)

The composition of matter claimed is an aqueous solution of sulfuric acid containing 0.002 to 0.1 per cent of iodine, added as tincture of iodine.

6 claims. —AES—

No. 2,708,655, May 17, 1955—Electrolytic Polishing of Aluminum—H. Turner, assignor to Union Carbide and Carbon Corp., New York.

Aluminum and alloys thereof may be polished by immersing in an aqueous electrolyte containing 45–80 per cent phosphoric acid, 5–20 per cent sulfuric acid and 3–15 per cent of an aliphatic poly-alcohol, and subjecting to direct current with the work the anode. One example is

	% by wt.
Orthophosphoric acid	66
Sulfuric acid	15
Ethylene glycolmonoethyl ether	3
Water	16

Operational details given were: temperature, 70°–80° C; voltage, 10–15; current density, 150 asf; and time, 5–30 minutes.

1 claim.

No. 2,709,847, June 7, 1955—Cadmium Plating Aluminum—M. Shire and F. Root, assignors to Bendix Aviation Corp., New York, N. Y.

The steps claimed for plating an aluminum body with cadmium are cleaning and etching, immersion plating with zinc from a zincate solution, electrodepositing copper or nickel, plating with cadmium from a cyanide solution, followed by a chromic acid treatment and baking.

11 claims, 1 figure. —AES—

No. 2,710,834, June 14, 1955—Apparatus for Selective Plating—M. Vrilakas, Sacramento, Cal.

A stop-off casing and arrangement is described which is particularly useful for chromium plating crankshafts.

7 claims, 3 figures. —AES—

No. 2,711,010, June 21, 1955—Electrodeposition of Antimony—W. Karasch, assignor to the Harshaw Chemical Co., Cleveland, Ohio.

The process is described for plating antimony over lead, tin, copper and silver (lead recommended over ferrous articles). The bath contains a water soluble antimony halide and an aromatic sulfonamide. Example I is as follows:

SbF_3	100–300 g/l
NH_4F	100–300 g/l
NH_4H	to give pH of 3.5–5.5
H_2O	remainder

13 claims. —AES—

No. 2,711,364, June 21, 1955—Polishing Metals and Composition Therefor—J. Beach, assignor to the U. S. A.

To polish zirconium metal with zirconium carbide occlusions use an aqueous solution of 50 g/l of water soluble fluoride, 350–600 ml/l of concentrated nitric acid and 175–400 ml/l of fluosilicic acid (30 per cent) at 60 to 85° F.

4 claims. —AES—

No. 2,711,379, June 21, 1955—Method of Controlling the Impurities in Semi-Conducting Materials—J. Rothstein, Assignor to the U. S. A.

Germanium or silicon may be purified by placing in an electric field in the presence of a spaced anode and cathode at a temperature that brings about sufficient mobility of the impurity ions, whereby the donor type ions move toward the cathode and acceptor type move toward the anode. This is continued until the desired purity is obtained, then the central region (pure) is cooled first and the less pure ends allowed to cool last.

3 claims, figure. —AES—

No. 2,711,389, June 21, 1955—Method of Applying Adherent Electroplates to Zirconium Surfaces—G. Faust, et al., assignors to U. S. Atomic Energy Commission

The zirconium metal is cleaned then immersed in an etching solution containing ammonium fluoride and hydrogen fluoride in molar ratio of 1.2–3.0. Time and temperature are given as 10–240 seconds and 70–120° F, respectively. After rinsing in water plate the zirconium with a metal from the iron group, followed by heat treatment at 1200–1600° F. The use of an aliphatic amine in etching bath is also claimed of the formula $C_nH_{2n+1}NH_2$ where n is 12–18 carbon atoms.

6 claims. —AES—

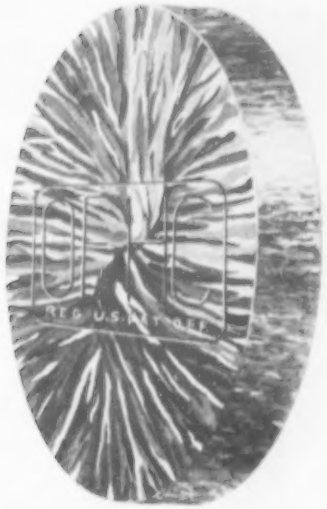
No. 2,711,391, June 21, 1955—Phosphate-Chromate Corrosion Protection in Water Systems—H. Kahler, assignor to W. H. and L. D. Betz, Philadelphia, Pa.

The process consists of adjusting the water pH to 5.25–7.8 and maintaining 5.188 ppm of water soluble chromate and 11–194 ppm of water soluble phosphate therein.

11 claims, figure.

premium copper demanded by electronics engineers . . .

Oxygen Free High Conductivity*



Actual-size reproduction of etched cross-section of oval OFHC Copper Anode. Note characteristic crystal structure.

*OFHC. Registered Trademark, The American Metal Co., Ltd.

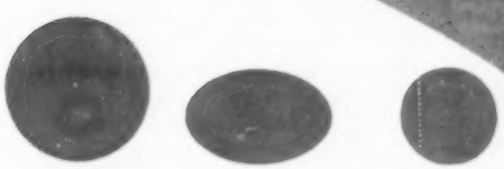
. . . now available as anodes for the plating industry

OFHC Copper has long been noted for its unique performance in specialized applications which demand extremely high purity and low porosity, such as the manufacture of precision vacuum tubes and other electronic devices. Recently made available to the plating industry, OFHC Copper Anodes are giving superior results in both acid and cyanide solutions. Their success with metal plating men is indicated by continually increasing sales!

OFHC Copper Anodes are made by a patented casting process which converts specially selected electro-deposited copper *directly* to the anode form. Deoxidizing agents and rolling are thus eliminated. The direct-casting method assures —

. . . complete absence of cuprous oxide
. . . total freedom from residual deoxidants
. . . density of rolled copper

Three shapes available in all lengths from 18" to 93".



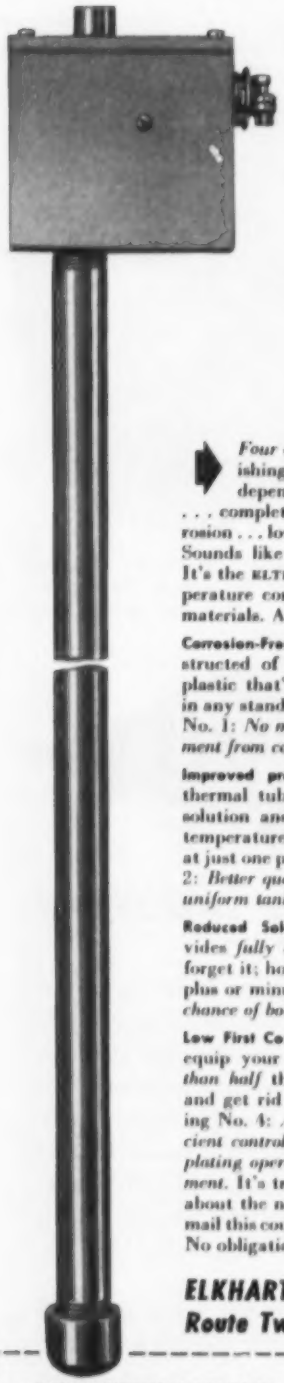
Round, 3" dia Oval, 2" x 3" Round, 2" dia

Get free booklet telling fully why OFHC Copper Anodes will help your plating operations. Write today to your local distributor or nearest address below and ask for Publication CA-10.

THE AMERICAN METAL COMPANY, LIMITED

New York	Boston	Detroit	Chicago	Los Angeles
61 Broadway	Statler Bldg.	Buhl Bldg.	1 No. LaSalle St.	Nat'l Oil Bldg.

NOW! A **NEW IDEA** *in*



PLATING BATH TEMPERATURE CONTROL

Cuts Costs 4 ways!

Four distinct savings in your metal finishing operations . . . accurate and more dependable bath temperature control . . . complete freedom from troublesome corrosion . . . low first cost, low maintenance cost. Sounds like a plater's dream. But it's not! It's the ELTEMP, an amazing *new idea* in temperature control . . . new in design, new in materials. And here's what it offers. . .

Corrosion-Free Service: The ELTEMP is constructed of a new, non-conducting thermoplastic that's absolutely unaffected by acids in any standard plating concentration. Saving No. 1: *No more costly maintenance or replacement from control deterioration.*

Improved product control: The ELTEMP's long thermal tube extends deep into the plating solution and automatically compensates for temperature changes *wherever they occur*, not at just one point in the electrolyte. Saving No. 2: *Better quality plating deposits through more uniform tank-depth temperature.*

Reduced Solution Spoilage: The ELTEMP provides *fully automatic control* . . . set it and forget it; holds its pre-set temperature within plus or minus one degree. Saving No. 3: *Less chance of boil-overs and loss of costly solutions.*

Low First Cost, Low Maintenance Cost: You can equip your tanks with the ELTEMP for *less than half* the cost of other control systems, and get rid of costly maintenance, too. Saving No. 4: *Accurate, dependable and more efficient control for this important phase of your plating operation . . . without a major investment.* It's truly a plater's dream. Learn more about the new, cost-saving ELTEMP. Clip and mail this coupon *today* for fully-detailed folder. No obligation.

ELKHART CONTROLS COMPANY
Route Two Elkhart, Indiana

ELKHART CONTROLS COMPANY
Dept. 12, Route 2, Elkhart, Indiana
Please tell me more about how we can save with the ELTEMP!

NAME_____ POSITION_____

COMPANY NAME_____

ADDRESS_____

CITY_____ ZONE____ STATE_____

No. 2,711,619, July 28, 1955—Buff and Core—J. Davies, Chicago, Ill.

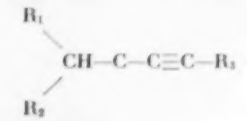
A bias type buff is described. Features mentioned in the disclosure are (1) a buffing surface formed of bias cut cloth which lies in a row of reverse folds, i.e., a zig-zag appearance from the side and a fullness with each reverse fold with the result that (2) the buff will always provide thread ends that cross-cut any marks.

4 claims, 12 figures.

—AES—

No. 2,712,522, July 5, 1955—Bright Nickel Plating—O. Kardos, et al., assignor to Hanson-Fan Winkle-Munning Company, Matawan, N. J.

This bright nickel process describes as addition agents to acid, aqueous nickel baths, aqueous, water-soluble acetylenic hydroxy compounds having the formula:



where

R_1 may be hydroxyl, hydroxymethyl or hydroxyethyl

R_2 may be hydrogen or methyl

R_3 may be methyl, hydroxymethyl, hydroxyethyl, methoxymethyl, diethylaminoethyl, morphilinomethyl, or hydroxypropyne radicals.

Claim 3 specifies 0.3 to 1.5 *g/l* of 2-butyne-1,4 diol and other claims describe the use of the acetylenic alcohols with sulfo-oxygen compounds such as benzene disulfonic acid.

7 claims.

—AES—

No. 2,713,553, July 19, 1955—Electrochemical Production of Periodate Oxypolysaccharides—C. Mehltretter, assignor to U. S. A.

This method for preparing oxypolysaccharides consists of passing an electric current through a solution containing a periodic acid and polysaccharide material using a cathode and a lead dioxide anode in the respective compartments.

3 claims, figure.

—AES—

No. 2,713,544, July 19, 1955—Electrolytic Method of Recovering Thorium from Monazite Sand—E. Pitzer, assignor to U. S. A.

Claim 1 states "the process of separating thorium from a rare earth which comprises electrolyzing an aqueous acidic solution containing essentially thorium ions, rare earth ions and phosphate ions to a pH of not greater than 0.5 whereby the thorium is precipitated as a thorium phosphate, leaving the rare earth ions in solution, and separating the thorium phosphate thus formed from the solution.

6 claims, figure.

—AES—

No. 2,714,089, July 26, 1955—Electrodepositing Iron—Walter Meyer, assignor to Enthone, Inc., New Haven.

The electrodeposition of iron from an alkaline bath is claimed. Example 1 is as follows:

Na OH	100 g
EDTA	231 g
Triethanolamine	132 g
Ferric ion	20 g
Water, q.s.	1 liter

The pH_c is given as greater than 11 and the current density as 3–300 asf. See page 41 of the PROC. American Electroplaters' Soc. for 1953.

6 claims.

For Your Plating File!

Why Big Savings Result When You Electro-tin Copper Wire with B&A Tin Fluoborate

The use of a Baker & Adamson Tin Fluoborate bath in electro-tinning copper wire results in a uniform, easily-controlled tin coating. Tin consumption is reduced more than two-thirds as compared with hot-dipped coatings.

Moreover, copper wire with a fluoborate-plated tin coating of 100 millionths of an inch may be readily drawn through dies for burnishing or for reduction in gage. For example, a plated No. 20 wire can be reduced to a No. 34 wire—a type of processing impractical with hot-dipped wire because of the structure of the coating and its non-uniformity.

The electroplated wire comes from the fluoborate bath with a fine grain coating that has a white matte color, excellent solderability, and good shelf life. The fluoborate bath has no fumes, requires no ventilation, and operation is fast and simple compared with alkaline baths. For full information, write for Baker & Adamson Technical Bulletin TC-43441, or call your nearest B&A office. *No royalties need be paid to use this process!*

REAGENTS B·A FINE CHEMICALS

BAKER & ADAMSON® *Fine Chemicals*

GENERAL CHEMICAL DIVISION
ALLIED CHEMICAL & DYE CORPORATION
40 Rector Street, New York 6, N. Y.

10 Basic Advantages of B&A Fluoborate Baths

1. **No mixing or dissolving needed—supplied in concentrated form**
2. **Easier bath preparation**
3. **Stability of bath composition**
4. **Ease of control**
5. **Practically 100% anode and cathode efficiencies**
6. **High conductivity**
7. **Good covering power**
8. **Fine-grained deposits of good color**
9. **Fast, high-speed operation**
10. **Readily adaptable for lead-tin alloy deposits**

As with Tin Fluoborate in the electro-tinning operation described, other B&A Metal Fluoborates offer additional special advantages in particular operations. Profit by using them!

BAKER & ADAMSON PRODUCTS
GENERAL CHEMICAL DIVISION
Allied Chemical & Dye Corporation
40 Rector Street, New York 6, N. Y.

Free! Data sheets giving full information on lead and tin fluoborates plus Bulletin TC-43441 on electro-tinning of copper wire. Write today!

Name_____

Company_____

Address_____

City_____ Zone____ State_____ PL-12

NARACO'S

10th ANNIVERSARY!

10 YEARS OF ...

pioneering in rack design by Naraco in the plating field have resulted in vastly increased efficiency and sharply reduced costs . . . years which, through the power of Naraco's advanced thinking, have seen the development of greatly improved techniques in rack engineering.

10 YEARS OF ...

Naraco growth reflects the scope and quality of rack service which Naraco has rendered to American industry . . . growth which is represented today by five plants each of which is a complete unit for the design and production of anodizing and plating racks which meet the needs of today's metal finishers.

NARACO

★ NATIONAL RACK CO., INC.
179-181 Madison Street Paterson, New Jersey

★ AMERICAN RACK CO., INC.
8139 N. Lawndale Avenue Skokie, Illinois

★ IMPERIAL RACK CO., INC.
1109 E. Stewart Avenue Flint 3, Michigan

★ INDUSTRIAL RACK CO., INC.
3462 N. San Fernando Rd. Los Angeles, Cal.

★ INTERNATIONAL RACK CO. INC.
3712 National Highway West Springfield, Ohio

ARTICLE REFERENCES

By
WILLIAM TUCKER

Eastman Kodak
Rochester, N. Y.

Most of the articles listed here may be obtained by writing to the publication. Addresses are included for the reader's convenience.

128. ALLOY

a. *ALLOY PLATING*
Robert T. Gore
Product Engineering, Vol. 26, September 1955, p. 136–139

129. ALUMINUM

a. *BARREL ANODISING AND DYEING OF SMALL ALUMINUM COMPONENTS*
Charles Etienne
Electroplating and Metal Finishing, Vol. 8, No. 10, October 1955, p. 359–363.

b. *SURFACE TREATMENT AND FINISHING OF LIGHT METALS. PART VII—INDUSTRIAL ANODIZING OF ALUMINUM AND ITS ALLOYS*
S. Wernick and R. Pinner
Metal Finishing, Vol. 53, No. 10, October 1955, p. 52–56

130. AUTOMATICS

a. *FROM SEMI TO FULL AUTOMATIC PLATING*
Fred G. Brune
Product Finishing, October 1955, p. 44-56

131. BARREL FINISHING

a. *PRECISION FINISHING IN A BARREL*
Precision Metal Molding, Vol. 13, September 1955, p. 70–73, 92

132. CHROMIUM

a. *NEW CHROME PLATING PROCCESS DEPOSITS HIGHLY DUCTILE COATINGS*
P. J. Topelian
The Iron Age, Vol. 176, No. 15, October 13, 1955, p. 99–101

133. COATINGS

a. *METAL COATINGS*
Donald Price
Industrial and Engineering Chemistry, Vol. 47, August 1955, p. 1511–1513

134. COPPER

a. *ELECTRON MICROSCOPE STUDIES ON COPPER DEPOSITS FROM SULFATE AND CYANIDE BATHS*
Shinzo Okada and Saburo Magari
Journal of the Electrochemical Society, Vol. 102, No. 10, October 1955, p. 580–585

135. CORROSION

a. *STAINING OF ENGINEERING COMPONENTS*
R. Graham
Corrosion Technology, Vol. 2, No. 9, September 1955, p. 275–277

b. *BASIC ESSENTIALS FOR THE REDUCTION OF ATMOSPHERIC CORROSION*
Frank Radecke
Corrosion, Vol. 11, No. 10, October 1955, p. 437–441

c. *NATURE OF THE PASSIVE FILM ON IRON IN CONCENTRATED NITRIC ACID*
Herbert H. Uhlig and Thomas L. O'Connor
Journal of the Electrochemical Society, Vol. 102, No. 10, October 1955, p. 562–572

d. *ELECTROCHEMICAL PRINCIPLES OF METALLIC COATINGS. III. CORROSION AT PORES AND DISCONTINUITY IN METALLIC COATINGS*
L. L. Shreir
Industrial Finishing (London), Vol. 8, July 1955, p. 389–392, 394, 400

136. ELECTROFORMING

a. *A NEW LOOK AT ELECTROFORMED PARTS*
H. D. Rice
Materials and Methods, Vol. 42, No. 3, September 1955, p. 99–101

137. GRINDING

a. *PROPER STORAGE OF COATED ABRASIVES*
Grinding and Finishing, Vol. 1, No. 5, September 1955, p. 43–44

138. MAGNESIUM

a. *NEW PROTECTIVE COATING FOR MAGNESIUM ALLOYS*
Light Metal Age, Vol. 13, August 1955, p. 22–23

139. MOLYBDENUM

a. *A SURVEY OF THE LITERATURE ON THE ELECTRODEPOSITION OF MOLYBDENUM*
T. T. Campbell and A. Jones
U. S. Bureau of Mines, Information Circular 7723, July 1955, 6 p

140. NICKEL

a. *BRIGHT NICKEL PLATING SOLUTIONS*
T. E. Such
Electroplating and Metal Finishing, Vol. 8, No. 10, October 1955, p. 347–350

141. ORGANICS

a. *ORGANIZATION AND ADMINISTRATION OF A PLANT PAINTING PROGRAM*
W. E. Chandler and C. W. Sisler
Corrosion, Vol. 11, No. 10, October 1955, p. 35–38

b. *THE TERNSTEDT-SPRAY PROCESS*
Howard E. Smith
General Motors Engineering Journal, Vol. 2, July-August 1955, p. 23–25

c. *EPOXY COATINGS PROTECT COPPER AND BRASS*
E. H. Christ
Organic Finishing, Vol. 16, August 1955, p. 13–15

d. *THE PREVENTION OF CORROSION DURING STORAGE AND TRANSIT*
C. F. McCue
Sheet Metal Industries, Vol. 32. No. 340, August 1955, p. 565–569; disc. p. 569–571

Chrome Plate over 3200 Pieces Per Hour with One Operator!

LASALCO's *New* CIRCULAR CHROME PLATER

Cost-cutter . . . time-saver . . . production-booster! Consider the unusual extra profit possibilities with this new high current density, continuously-moving cathode chrome plater:

- Exceptionally high output—3290 pieces, up to 3" long, per hour at 23 seconds. Minimum output, 530 pieces per hour at 2.39 minutes. (Alternate slower drives for heavier plating.)
- One-man loading . . . fully automatic unloading.
- No racks . . . no rack upkeep.
- Easily removable sectionalized cover of Plexiglas, plus easy-to-raise driving mechanism and cathode wheel, gives quick access to coils and anodes. Parts falling into tank are instantly recoverable.
- Simple installation requires only electrical connections and exhaust duct. Plater delivered complete, ready to install.

SPECIFICATIONS

Cathode Wheel Diameters 30", 31 Bronze Work Carriers 3.24" O.C. Effective Plating Travel 68.4".
Inner Anode Diameter 24"; Outer Anode 40".
Center Of Anode To Cathode 4".
Tank Diameter 54"; Depth 14". 3/32" Koroseal Lining.
Solution Capacity 115 Gals. 2" From Top.
Anodes: Flat 16 lb. 6% Antimonial Lead—Outer ¼"x9"x7'5"; Inner ¼"x9"x4'4". Anode and Cathode Tops ¼"x2". Copper Bars.
Bused For 500 Amps.
Heating (Standard): ½" I.D. 6% Antimonial Lead Steam Coil. (Available For Electric Heating.)
Drive: ¼ HP 110/220 1- Phase 60 Cycle AC Motor. Variable Speed Reduction.

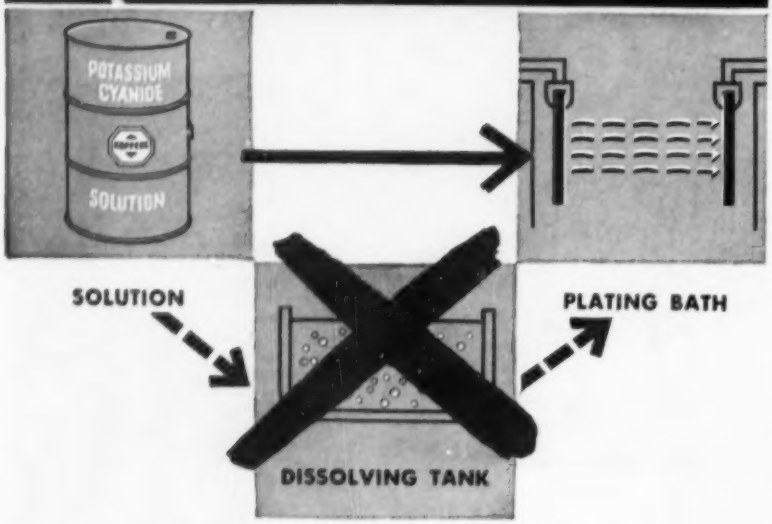
Write Now . . . Get The Facts About This Money-Maker

LASALCO, INC.

HOME OFFICE
2820 LaSalle St. • St. Louis 4, Mo.
PRospect 1-2990

IN TEXAS
501 West Eighth St. • Irving (Dallas), Tex.
Phone: 3-4921

Short-cut to lower plating costs



with Koppers Potassium Cyanide Solution

KOPPERS Potassium Cyanide Solution (35-40%) eliminates the dissolving step in your plating operation. It is delivered to you, ready for the plating bath. Time-consuming preparation is out. There are no dangerous cyanide granules to handle, no drum cleaning, and no need to expose working personnel to cyanide powder dust.

All of these unique qualities of Koppers Potassium Solution add up to lower costs to you.

You can order Koppers Potassium Cyanide Solution in 55-gallon drums or in tank-truck quantities, ready to be pumped directly into your storage tank.

Potassium Cyanide is only one of the many synthetic chemicals produced by Koppers. Others include Resorcinol, Styrene Monomer, Polystyrene, Phthalic Anhydride, Divinylbenzene, and Di-tert-butyl-para-cresol.

For further information on any of these chemicals, write to:

KOPPERS COMPANY, INC.

Chemical Division, Dept. P-125, Pittsburgh 19, Pennsylvania

KOPPERS ®

Koppers Chemicals

SALES OFFICES: NEW YORK · BOSTON · PHILADELPHIA · ATLANTA
CHICAGO · DETROIT · HOUSTON · LOS ANGELES

ARTICLE REFERENCES

142. PLATING

a. *PLATING METAL POWDER COMPACTS*
Charles C. Cohn
Metal Industry, Vol. 87, August 12, 1955, p. 128–129, 134

143. PUMPING

a. *GETTING THE MOST OUT OF CENTRIFUGAL PUMPS*
Eugene Brooks
Metal Finishing, Vol. 53, No. 10, October 1955, p. 57–60

144. SILVER

a. *SILVER PLATING ALUMINUM BUS BARS*
Julius Toth and H. E. Ricks
Metal Finishing, Vol. 53, No. 10, October 1955, p. 44–46

b. *RADAR PARTS PRECIOUS METAL PLATED FOR CONDUCTIVITY*
Burt R. Servass
Precision Metal Molding, Vol. 13, August 1955, p. 52–53, 80

145. TIN

a. *THE ALLOY GROWTH RATE OF 0.25 POUND ELECTROLYTIC TIN PLATE IN THE TEMPERATURE RANGE 380–440 F*
William N. Lambert
Corrosion, Vol. 11, No. 10, October 1955, p. 454–458

Below are listed the addresses of publishers where the reader may send for article references.

Light Metal Age
220 S. Street
Chicago 4, Illinois

Product Engineering
330 W. 42nd St.
New York, New York

Industrial and Engineering Chemistry
430 Park Ave.
New York 22, N. Y.

Materials and Methods
430 Park Ave.
New York 22, N. Y.

Grinding & Finishing
220 E. Willow Avenue
Wheaton, Illinois

U. S. Bureau of Mines
Information Circular

Metal Industry
9 Charlotte St.
Birmingham, England

Electroplating and Metal Finishing
85 Udney Park Rd.
Teddington, England

American Machinist
330 W. 42nd Street
New York, N. Y.

Corrosion
M & M Building
Houston 2, Texas

Finish
Elmhurst Nat'l Bank Bldg.
York St. at Park Avenue
Elmhurst, Ill.

Industry & Welding
1240 Ontario Street
Cleveland 13, Ohio

Iron Age
56th and Chestnut Sts.
Philadelphia, Pa.

Journal of the Electrochemical Society
216 W. 102nd Street
New York, N. Y.

Metal Finishing
381 Broadway
Westwood, N. J.

Organic Finishing
381 Broadway
Westwood, N. J.

Precision Metal Molding
1240 Ontario Street
Cleveland 13, Ohio

Products Finishing
431 Main Street
Cincinnati 2, Ohio

Worth crowing about . . .

for ELECTROLYTIC CLEANING of STEEL and COPPER

New Improved AHCOLOID "200"

Non-dusting, low foaming, *improved* Ahcoloid 200 is safer and easier to use than conventional heavy duty cleaners. Special Ahcoloid agents control escape of gases generated during anodic or reverse current cleaning. There is never a spray or overflow of caustic solution.

New, improved Ahcoloid 200 is a free-flowing alkaline powder that quickly and thoroughly frees steel or copper surfaces from grease, oil, metal particles, carbon deposits, or residue from such operations as buffing, stamping, or grinding.

It will pay you to find out more about *new, improved* Ahcoloid 200, the heavy duty cleaner with extra penetrating, wetting, and emulsifying power.

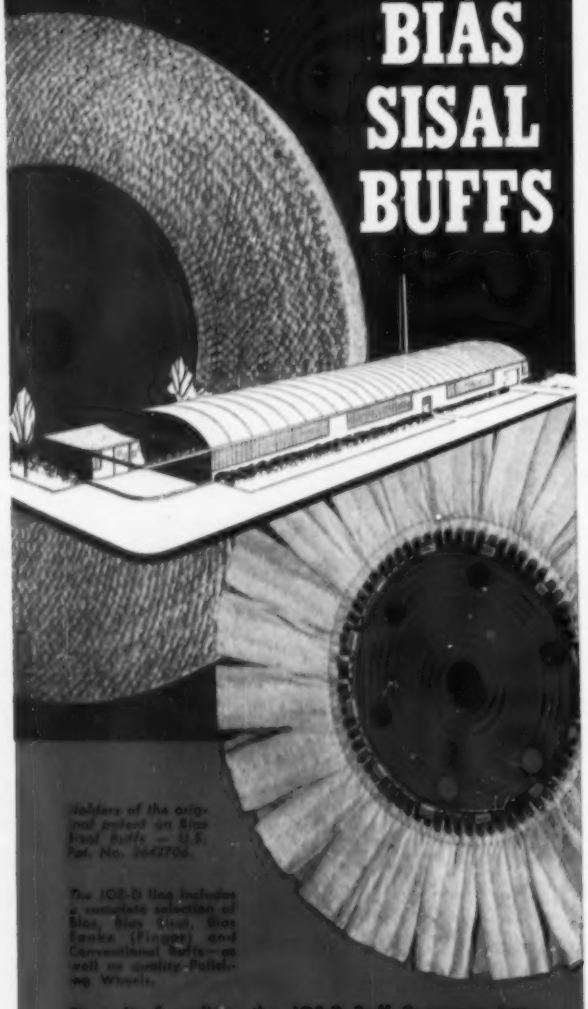
For full details about *new, improved* Ahcoloid 200, write today to Apothecaries Hall Company, 22 Benedict Street, Waterbury, Connecticut.

Apothecaries Hall Co.

The "House that Sisal Built"

JOE-D ... Originators of

BIAS SISAL BUFFS



Holders of the original patent on Bias Sisal Buffs — U.S. Pat. No. 2647700.

The JOE-D line includes a complete selection of Bias, Bias Sisal, Bias Spoke (Fingo) and Conventional Buffs—as well as quality Polishing Wheels.

Since its founding, the JOE-D Buff Company has specialized in Sisal — constantly experimenting and testing ways to give you faster-cutting, longer-lasting Sisal Buffs. Made of the finest quality imported sisal, specially woven and processed for guaranteed fray-proof performance . . . never a loose end to whip or scratch . . . always an even nap to hold compound and provide better color. For every Sisal Buff requirement, specify JOE-D, the original — and still America's finest — Bias Sisal Buff!

ATTENTION JOBBERS: Some choice territories still available. WRITE TODAY!

the JOE-D Buff Company

SANDWICH, ILLINOIS • TELEPHONE 2171

25 Years Ago...

. . . an editorial concerned itself with the Christmas Spirit and talked of being children again. President Gehling was wished a happy, joyful Christmas along with his official family and our whole membership at home and abroad.

C. J. Werlund, in an article from the Washington Convention of 1930 brought advance notice of "another bright plating process"—the deposition of zinc-cadmium alloys.

On the AES page there was a report that platers' classes were being formed in many of the Branches: Hartford, Springfield, Rochester, Bridgeport and many more.

Branch News reported many technical facts from the educational meetings.

The AES page carried everything—even poems. This one, from the December 1930 issue of *Monthly Review* is typical:

The optimist fell ten stories.

At each window bar

He shouted to his friends:

"All right so far."

10 Years Ago...

. . . the *Monthly Review* carried some sixty-two pages of ads and some fifty pages of reading matter. The main concern of everyone was the war, and an announcement on the front cover read: "Next Month You'll See Completed Plans for the Hall of Platers' Contribution to the War Effort."

Paul E. Miller had an article entitled, "Pricing Job Plating," which concerned itself with the practical problem of getting enough return for the work done by a plating shop.

There was an article on "Hazardous Plating Chemicals" and Messrs. Ferguson and Stephan had authored the AES Research Project No. 3 paper on "Adhesion of Electrodeposits, III."

Interest was being stimulated for the Pittsburgh Convention where a well-balanced educational program was promised.

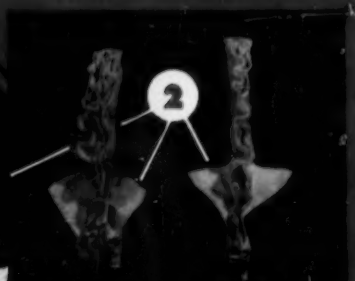
The magazine was a good one, informative (if one reads the ads) digest size, containing 116 pages.

No other Buff...

has all these advantages

CODMAN NON-FRAY BUFFS

1. THICKNESS OF RING VARIES DENSITY
2. TRAILING ENDS — (Safety)
3. NON-COMPRESSIBLE CONSTRUCTION
4. NON-METALLIC CENTER — (No Shaft Scoring)



OPEN FACE CLOSED FACE

Available-Closed or Open Face Ventilated, Of Course, When Necessary

F. L. & J. C. CODMAN COMPANY

ROCKLAND, MASSACHUSETTS

the greatest name in buffs for over 55 years

BRANCH OFFICES — PHILADELPHIA, DETROIT, LOS ANGELES, INDIANAPOLIS, GRAND RAPIDS

INTERSOCIETY NEWS

NAMF Announces Plans for Seminar

The National Association of Metal Finishers, recently re-organized to represent job-shop finishing companies from coast to coast, has announced its sponsorship of a Management Seminar in Chicago. The Seminar will be held at the Conrad Hilton Hotel on Friday and Saturday, January 27-28, 1956, in conjunction with the Annual Educational Sessions of the Chicago Branch, American Electroplaters' Society.

The program for the event will include talks on topics of interest to the management of job shops and finishing departments. The program will include a banquet on Friday evening, with sessions both on Friday afternoon and on Saturday. Featured in the program will be two conference sessions during which attendees will have the opportunity to discuss their individual plant problems with a variety of guest experts from all phases of management.

Association President John Pulik, Jr., National Plating Corp., Cleveland, Ohio, has announced that a charge of ten dollars per person will include the cost of the banquet and the entire program. Invitations to the event will be sent to owners and operators of job-shop finishing firms throughout the country and to managers of finishing departments of manufacturing firms. Attendance is limited to these groups.

The Society of Die Casting Engineers Names New Detroit Chapter Officers

Results of the mid-summer mail-ballot election have been announced by the Eastern Michigan (Detroit) chapter of The Society of Die Casting Engineers. Officers for the calendar year 1956 are: chairman, John Lapin, chief die-cast engineer for Saginaw Bay Industries in Bay City, Michigan; vice-chairman, Marshall Aberle, chief die-cast engineer for H & M Industries, Inc., of Flat Rock, Michigan; secretary-treasurer, Louis Draves, process engineer with Ternstedt Division of General Motors Corporation in Flint; librarian-historian, Frank S. Marra of Detroit Mold Engineering Company in Detroit; trustee, Harry D. Hirsch, president of C. M. Hall Lamp Company of Detroit.

Lapin, the new chairman, has been recording secretary during 1955; Aberle repeats as vice-chairman. All others elected have not held office before, but have been active in Society affairs. H. W. Roushkolb of Cleveland Automatic Machine Co. and John L. Miller of H & M Industries, Incorporated, continue as trustees. Trustees are elected for a term of three years.

ALCA and ASTM Cooperate to Develop Leather Standards

The American Leather Chemists Association, an organization of technical people from the leather industry, is joining forces with the American Society for Testing Materials in establishing a joint committee on development of leather standards. The organizing group, which met at ASTM Headquarters in Philadelphia, October 12, under the chairmanship of M. Maeser, United Shoe Machinery Corp., includes: Malcom Battles, A. C. Lawrence Co.; Alfred M. Compton, E. F. Houghton & Co.; Joseph Kanagy, National Bureau of Standards; Arthur M. Kay, Howe's Leather Co., Inc.; and R. J. Wirshing, General Motors Corp.

This group, enlarged with representatives from several other interests in the leather industry, will meet again in the near future to complete the organization of a joint ALCA-ASTM Committee on Leather. For the present, efforts will be limited to development of physical test methods.

The ALCA for a number of years has been actively engaged in the development of testing methods. These methods have been closely coordinated with those of the Federal Government. The ALCA methods which are standards for the industry will form a basis for the initial work of the joint committee.

One of the important objectives in the establishment of the new committee is to bring together representatives of leather tanners, fabricators, users, and those with a general interest, to meet and solve problems of mutual interest. It is expected that the joint activity will result in the development of test methods which will have wide utility and acceptance in industry and commerce.

Brooks on Jelrus Precision Investment Casting

A detailed discussion of the investment casting process, by Louis E. Brooks, general manager of Jelrus Precision Casting Corporation, New York, and a director of the Investment Casting Institute, highlighted a recent meeting of the Potomac Chapter of the American Society of Tool Engineers, Washington.

Brooks' talk covered the subject of "Jelrus Precision Investment Casting" beginning with the history of investment casting and continuing with the modern development of the process, methods used, size and types of castings, materials, tolerances, finish and costs.

According to Brooks, "any metal that can be cast can be utilized by this process; this includes all the soft metals, mild steel, tool steel, stainless steel and all alloys."

"Aluminum can be cast as thin as 1/32 in, steel as thin as 3/64 in, with 120 to 60 micro finish. The accuracy which can be obtained on close tolerances can be held to ± 0.005 in per linear inch. Small parts $\frac{1}{4}$ in or less can be held to ± 0.003 in. Tolerances on bulky parts or sections are held to $\pm 1/64$ in."

Brooks also noted that investment castings are heat treatable to the same hardness and tensile as bar stock. And that further, with the close tolerances and fine finish possible, very little additional machining is necessary.

In conclusion, Brooks recommended that "designers should carefully analyze tolerances on parts to be cast so that time can thus be saved in both casting and machining."

AES Family Plan

Railroads, airlines and what have you are all shouting about family plans these days, so why not the AES, too? The Washington Convention Committee is determined to accumulate enough attractions so that the wife and youngsters will surely be on hand, and if there's enough money left in the sock for the old man of the household, he can come, too.

The Ladies Committee is lucky enough to have the devoted efforts of Mrs. Mary Pierdon who will rally the distaffs—females to you, bub—around the slogan . . .

WASHINGTON D. C. IN 1956
A CAPITAL IDEA

· DEADLINE ·
for Papers and Abstracts
for the
Washington Convention
June 17-21, 1956
are

ABSTRACTS
before January 1, 1956

MANUSCRIPTS
before March 1, 1956

Send triplicate copies to Convention Educational Chairman, Dr. Abner Brenner, National Bureau of Standards, Washington, D. C.

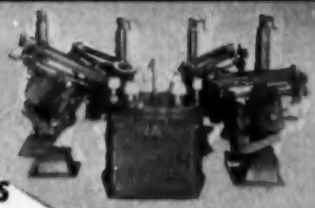
Further information may be obtained from

P. P. Kovatis, Executive Secretary
445 Broad Street, Newark 2, N. J.

ACME *Rotary Automatics*

...cut costs on production finishing

536-145



512-9-2

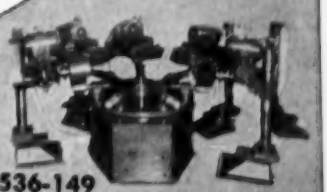
ROTARY TABLES ARE AVAILABLE IN SIZES UP TO 24 FT. DIAMETER

534-337

ACME 8 FT. *Combination Type* ROTARY AUTOMATIC

● This machine can be readily changed from a 32 spindle continuous rotary automatic to an 8 station indexing rotary automatic by simple hand crank adjustment. Various types of ACME adjustable floating head polishing and buffing lathes are used including belt arm attachments on buffing heads, utilizing the same heads for buffing or belt operations. Spindle arrangements are available in multiples of 8.

Rotary Catalog on Request.



536-149

RECOMMENDATIONS and QUOTATIONS . . . will be offered on receipt of blue prints or preferably finished and unfinished parts you contemplate finishing, together with details of your present finishing operations and production requirements.

SPECIAL MACHINERY — AUTOMATIC BUFFING MACHINES

ACME *Manufacturing Co.*

Builders OF AUTOMATIC POLISHING AND BUFFING MACHINES FOR NEARLY HALF A CENTURY

1400 E. 9 MILE RD., DETROIT 20 (Ferndale) MICH.

BALTIMORE-WASHINGTON CONVENTION NOTES

Chase Ltd. photo

BIG SPOKES of the Baltimore-Washington Convention Committee wheel planning the 43rd Annual AES Convention: standing, l to r—Wendell P. Barrows, entertainment; William Metzger, Jr., outing; Dr. William Blum, honorary co-chairman; Vincen J. Hughes, Jr., plant visitation; Kenneth M. Huston, co-chairman; Raymond Stricklen, publicity; Asaf A. Benderly, hotel; Jules Horelick, finance; seated, foreground, Vernon A. Lamb, banquet; l to r—Dr. Abner Brenner, education; Fielding Ogburn, registration; Arthur G. Pierdon, co-chairman; Miss Ellen Pierdon, secretary; Mrs. Kenneth M. Huston, ladies; Mrs. Wendell P. Barrows, ladies; Mrs. Mary A. Pierdon, ladies chairman; Carl H. Thiede, program

A Capital Time with the AES In the Capital City of the U. S.

As might be supposed, the problem in planning ladies' activities in Washington is not in finding enough things to do, but how to schedule as many as possible of those which unquestionably would be highly popular. Much more about this later.

Let's swing now to the children, wherein lies a first for the Washington Convention. A program is being worked up for youngsters between 7 and 14 years of age. (Your reporter did his darnedest to whip up something especially for cute chicks just a little older, but the Committee was afraid of a Congressional investigation.) The young folks will get in on some of the affairs attended by the ladies, and will have some special activities all their own, such as a tour of Capital Airlines at the Washington National Airport. There is to be a Children's book of tickets at a reduced registration fee of only $10 each. This will not provide for the banquet, although children will be welcome at this function.

Speaking of food, Vernon Lamb is making certain that the banquet will bring forth lots of goodies to fill that aching void. And Mr. & Mrs. Wendell Barrows are seeing to it that the evening will be topped off with a splendiferous show. Washington puts on lots of shows, you know, occasionally right out in public. Incidentally, it's no secret that many a Senator who can't cut a budget can really cut a rug!

Just for the record, the Metal Finishing Suppliers' Association have given assurance that they will again be congenial hosts for the popular Open House on Monday evening.

The Outing under the guidance of Bill Metzger promises to be a super-duper. Buses from the hotel will arrive at Arlington National Cemetery in time to view the changing of the guard at the Tomb of the Unknown Soldier. This is an unforgettable experience, impressive for its precision, and symbolic of the revered memory in which all who died for their country are held. The buses will then proceed through Alexandria, Virginia and on to historic Mount Vernon. Time will be allowed for visiting this home of George Washington, after which there will be a boat trip back to Washington with refreshments en route. What an afternoon!

Just don't forget that family plans on railroads and airlines make it much less expensive to get there and back, in case you prefer not to drive, and the family plan in many of the Washington hotels takes much of the sting out of the cost for the youngsters, namely, no charge for children up to age 14 who occupy the same room as their parents.

Think it over and surely you'll agree that for the whole family it will be . . . **Washington, D. C., in 1956**—A Capital Idea.

Effective December 15, 1955

PRICES REDUCED UP TO 20%

Sel-Rex RECTIFIERS

New mass production techniques brought about by the increased demand for Sel-Rex Rectifiers have enabled us to reduce manufacturing costs. These savings are being passed on to you in new low prices for the entire line of Sel-Rex quality rectifiers.

This, despite the fact that higher prices for steel, copper, selenium and various components have forced all other rectifier manufacturers to increase prices. Now — you can own the standard of the industry for no more than it would cost you to buy an ordinary rectifier. You pay no premium for Sel-Rex superiority!

Send for your free copy of our illustrated 12 page "Guide to Better Plating Power," no obligation.

BART-MESSING CORPORATION

Sel-Rex Rectifier Division

Dept. PL-12, 229 Main Street • Belleville 9, N. J.

Newark • Detroit • Los Angeles

Sel-Rex Rectifiers for every DC Power Conversion need — 25 to 50,000 amperes.

AES NEWS

Long Way for AES Membership

Folke Soderstrom, Works Manager, AB Nordiska, Armaturfabrikerna of Kungsor, Sweden (left), receives AES Member-at-Large card from Executive Secretary Peter Kovatis. Soderstrom applied for membership during a visit to National Headquarters recently. During his brief visit in the U. S. he visited plating installations in the east and mid-west.

Combs to AES Liaison Post

Combs

Eugene L. Combs, Supervisor of Chromic Acid Sales, Diamond Alkali Company, and member of the Cleveland Branch, was appointed AES Liaison Representative to ASA Section Committee B-73 on centrifugal pumps for chemical industry use. This announcement was made this month by Clyde Kelly, Society President.

The newly activated committee of the American Standards Association hopes to effect an estimated savings of $6,800,000 annually to the chemical industry alone plus additional savings to users. Committee B-73 objectives: (1) to provide pumps with maximum operating and mechanical reliability; (2) to provide uniformity of certain dimensions for interchangeability of comparably rated pumps of different manufacturers; (3) to provide pumps the use of which will achieve minimum maintenance costs, inventories, and installation costs; and (4) to provide standard letter identification for dimensions, standard nomenclature, and standard definitions.

Date Set for Tri-State Regional

The "Third Annual Tri-State Regional Meeting" will be held in Dayton, Ohio on March 10, 1956 at the Dayton Biltmore Hotel with the Dayton Branch of the AES acting as hosts. The usual educational session will be held in the afternoon followed by a banquet, floor show, and dancing in the evening. Plant visitations are also scheduled for the morning hours.

Following is a list of the committee members: Chairman, Robert L. Ruleff, Ruco, Incorporated; Co-Chairman, Holle Leuchauer, Moraine Products Division, G.M.C.; Hotel Arrangements, Frank J. Klein, Rack Processing Company; Educational Session, Holle Leuchauer, Moraine Products Division, G.M.C.; Program Advertising, John Easton, National Cash Register Company; Publicity, Ezra Blount, Products Finishing Magazine; Treasurer, John Baker, G. H. Leland Company; Entertainment, Bennie Cohen, Wright Patterson Air Force Base; Favors, A. W. Wendt, Delco Products Division, G.M.C.; Secretary, Norbert Mollman, National Cash Register Company; Plant Visits, Fred Bauch, Frigidaire Division, G.M.C.; Ticket Sales, John Baker, G. H. Leland Company; Julius Teres, Wright Patterson Air Force Base.

There will be a total of three speakers at the educational session. One speaker will be Helmer Bengston of the Stolle Corporation, who will speak on "Color Anodizing." Other speakers are not yet announced.

Carr Addresses New York Branch of American Electroplaters' Society

Dr. Dodd S. Carr, Assistant Director of Electrochemical Research, Bart Laboratories Co., Inc., Belleville, N. J., described the practical electroplating course sponsored by the Newark Branch of the Society, at a recent meeting of the New York Chapter.

Carr

The audience was particularly impressed with the unique "practicality" of the course which incorporates lectures by qualified instructors and tours of commercial plants actually performing the work and processes covered by the lecture sessions.

Dr. Carr told the gathering that registration for the electroplating course had so greatly exceeded expectations that a second course for the Spring "Semester" had to be planned to accommodate the overflow.

Members of other Branches of the Society interested in exploring the possibility of offering a similar course, may write directly to Dr. Dodd S. Carr, c/o Bart Laboratories Co., Inc., 227 Main Street, Belleville, N. J., for more specific information on the various aspects of this course, which was so well received by the Newark membership.

MAIL BOX

JULY 26, 1955

Dear Sirs:

I am writing just to say how very pleased I am at the response so far from our little advertisements of the Langford and Colegate text books in PLATING, and hope that you will, perhaps, shortly have a little room to spare for the Morisset "Chromium Plating" book, when I hope we shall get a similar response.

Yours sincerely,

C. R. Draper
Managing Editor
Electroplating & Metal Finishing
85, Udney Park Road
Teddington, Middx.

DEAR SIRS:

I am very late in saying thank you for the very nice job you did in your October issue.

I have watched your cover development program, particularly the steps you took in October and November. Keep it up. There's no reason why a sober business publication should not be packaged with imagination. It's quite possible for a gal to be an attractive blonde *and* a good cook—and for a business publication to be solid without being dowdy.

Thanks again for your interest and please do not hesitate to command me if I can help.

Sincerely,

John J. McMahon
John J. McMahon
Incorporated

DEAR SIRS:

Let me congratulate you on the November issue of PLATING magazine.

I believe that it is outstandingly impressive and that the technical aspects are excellent.

May you be congratulated in your efforts with regard to the American Electroplaters' Society and the strides you are making.

Very truly yours
Rockwell Spring and
Axle Company
M. B. Hammond
Vice-President

DEAR SIRS:

I have just looked at the November issue of PLATING and would be remiss if I did not pass on to you and Mr. Doria my compliments. You have certainly made PLATING look like something! Keep up the good work!

Kindest regards.

Yours very truly,

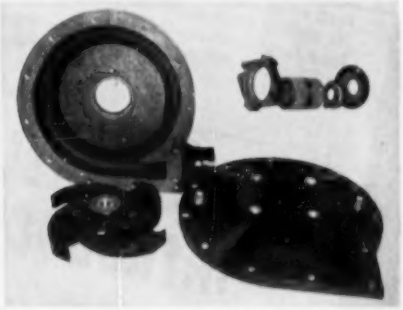
Leonard E. Weeg
National Lock Co.

WHERE HAVEG EQUIPMENT IS INSTALLED

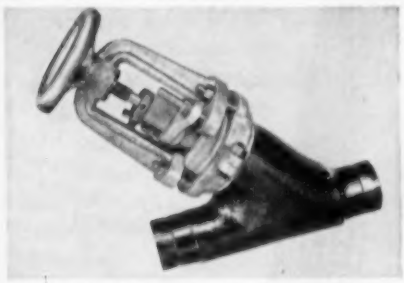
TRADE MARK REG. U. S. PAT. OFF.

PIPE • DUCT • FITTINGS • VALVES • PUMPS

A typical large installation of Haveg pipe, valves and fittings showing simple method of support required. Haveg pipe is unaffected by thermal shock, seldom requires insulation.



These Haveg parts are used in pumps for hot (104°F.) 30% Hydrochloric acid. Typical record: 33 months without replacing a single part. Many users report even longer life.



Escape potential valve troubles by buying Haveg y-valves and diaphragm valves which are smooth-molded, exactingly machined, tested in the Haveg factory. Haveg works with you on special designs!

Processing Corrosion has been Controlled!

Where liquids get hot and corrosive, it pays to consider all the facts about Haveg piping systems. Haveg has all the major ingredients for good chemical piping. Strength. Durability. Light weight. Outstanding resistance to corrosion and thermal shock.

It withstands rapid temperature changes and enables you to go into a high range of process temperatures with complete safety and a proven history of reliable performance. Haveg piping resists corrosion of practically all acids (except oxidizing acids) and lasts for years without repairs or maintenance.

Haveg *piping* is molded in diameters of ½" up and comes in lengths to 10'. It can be cut and fitted on the job (a new Haveg tool makes this even simpler—ask your Haveg engineer for details). For handling corrosive gases or fumes, Haveg *duct* is made in cylindrical or rectangular shape with lighter walls. Fume hoods, bifurcators, fan housings, fittings, all are made from Haveg and give complete containment and control of corrosives.

It's a long story telling all about Haveg, the moldable, thermosetting plastic material made of acid-digested asbestos and synthetic resins. Haveg is both a material and a service . . . it comes from America's first molders of corrosion-resistant plastic equipment. It can be as big as a 200' stack, as small as a miniature pump part. Call the experienced sales engineer listed. Write for the 64-page illustrated Bulletin F-6 which contains size and chemical resistance charts, design specifications. Remember, Haveg is a logical, proven answer to your design problems in handling hot, corrosive liquids; in fact, in all equipment that must control processing corrosion.

ATLANTA 5, Exchange 3821 • DETROIT 39, Kenwood 1-1785
CHICAGO 11, DElaware 7-6088 • HOUSTON 4, Jackson 2-6840
CLEVELAND 20, Washington 1-8700 • LOS ANGELES 14, Mutual 1105
WESTFIELD, N. J., Westfield 2-7383

HAVEG CORPORATION
TRADE MARK REG. U. S. PAT. OFF.
A SUBSIDIARY OF HAVEG INDUSTRIES, INC.
918 GREENBANK ROAD • WILMINGTON 2, DEL. WYman 8-2276

feature should be called on less than its ability to protect the cleaned surface from contamination.

The zinc ammonium chloride corresponding to the formula $ZnCl_2$ reducing atmosphere. Such studies have led to a final shortening of the total time through the zinc kettle for many products, including continuous processes for wire and strip.

NEW LEVELUME PROCESS INTRODUCED BY H-VW-M

FIRST NICKEL PLATING PROCESS COMBINING FULL BRIGHTNESS WITH "TRULY AMAZING LEVELING" ANNOUNCED BY MATAWAN, N. J. FIRM.

Matawan, N. J.—Levelume, a new bright nickel process giving deposits combining "full brightness with truly amazing leveling," was released for general use today by Hanson-Van Winkle-Munning Company, Matawan, N. J., suppliers to the metal finishing industry. Officials of the company stated that the Levelume Process is a milestone—the first nickel process to combine qualities of brightness, high leveling and exceptional speed.

Years of research went into the development of the process, and the result, according to H-VW-M officials, is a process imparting "optimum qualities of brightness, leveling, surface activity, ductility and controlled stress at exceptionally high deposition rates." The process has already been field tested in several high production automatic conveyors. One leading auto parts producer, it is reported, has increased production well over 100% without investing in new conveyors, enlarging tanks or changing racking methods.

Newly discovered addition agents are the key to the phenomenal success of Levelume. With the new process, plating is done at higher temperatures and higher current densities. Air agitation and continuous filtration through activated carbon prevent contamination build-up that normally leads to deterioration of the deposit's physical properties.

Replacing the muriatic acid flux wash water solution of zinc ammonium chloride found wide acceptance ago in all fields except some of

$3NH_4Cl$, has remained unchanged during these years. Much has been learned about the things that can be done with this compound itself and its water solutions. The melting point is recorded as 644 degrees Fahr., and only as this temperature is ap- sal

quality treatment. A
special arrangement
flow of current as t
Leads (D) are cont
assembly during the
the work reaches the
place.

Modern requirements
protective finishes on
industrial products en
expanding need for au
finishing machinery—lik
Automatic Conveyor Sy
ume metal finishing—at
never before attained—is
reality for almost every
dustrial application.

Whether the operation
the process complex or
automatic conveyor sy
cially designed to provi
quantitative producti
Fully automatic
systems—synchronize
flow—automatically con
untouched through an en
cycle. Without a single man
racks can be transferred
tank, dipping or by-passing a
may require, delivering at
discharge on a perfectly time
Plating, anodizing, stress reli
cleaning, phosphate coating,
ping, painting, etching—all
other finishing processes a
cally and economically han
Constant leadership in
development over more
ensures a complete
cision finishing
efficiency of
veyor systems is
understanding.

Self-lubricating an
(E) is used for both
either one of which
steps in the overall
circuits may be sta
conveyor

PLATEMANSHIP

HANSON-VAN WINKLE-MUNNING CO. MATAWAN, NEW JERSEY, U.S.A.

Your H-VW-M combination—of the most modern testing and development laboratory—of over 80 years experience in every phase of plating and polishing—of a complete equipment, process and supply line for every need.

INDUSTRY'S WORKSHOP FOR THE

Levelume

READ ABOUT THE NEW PRODUCTION-PROVED H-VW-M NICKEL PROCESS THAT COMBINES BRIGHTNESS AND EXCEPTIONAL LEVELING WITH UNUSUALLY HIGH SPEED

This outstanding, new, high-speed LEVELUME PROCESS has all these advantages—

HIGH BRIGHTNESS – Recessed areas have uniform brightness without shading . . . subsequent deposits are brighter.

EXCEPTIONAL LEVELING—Because of high scratch-filling properties, polishing and buffing can be substantially reduced, sometimes even eliminated. Enormous savings result.

WIDE CURRENT DENSITY RANGE – Can vary from 20-150 asf (normal 60-100 asf). Higher current densities mean faster plating and reduction in equipment, floor space and manpower.

HIGH THROWING POWER – Recesses are covered satisfactorily and good distribution of deposit makes specification conformance possible without piling-up nickel on exposed portions.

CONTROLLED STRESS—No cracking, crazing, lifting or brittleness of deposits.

HIGH DUCTILITY – Comparative tests show good ductility, maintained even after continued bath use.

EXCELLENT CORROSION PROTECTION—Equal to deposits from other bright or leveling solutions.

VERSATILE—Can be used as single coating or, if higher corrosion protection is desired, a Nickle-Lume top coat can be applied.

EASY SOLUTION CONVERSION TO LEVELUME—With few exceptions other bright nickel baths can be converted.

HIGH SURFACE ACTIVITY – Plated surfaces accept chromium and other deposits without activating treatments. You'll experience none of the ordinary difficulties of other bright nickel processes with LEVELUME. One manufacturer reduced chromium plating rejects 12 per cent using Levelume.

— and these advantages, too . . .

- Bath Stable in Operation
- Pleasing White Color Deposits
- Simple Control
- No Objectionable Fumes
- High Tolerance to Impurities
- Low Operating Costs

LEVELUME is already proving its unusual value to enthusiastic users across the country. You can get complete details, and the Levelume Instruction Manual, by writing H-VW-M.

HANSON–VAN WINKLE–MUNNING COMPANY, MATAWAN, NEW JERSEY

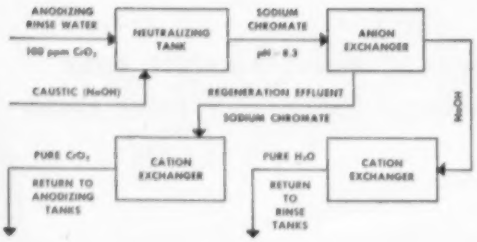
PLANTS: MATAWAN, NEW JERSEY • GRAND RAPIDS, MICHIGAN

SALES OFFICES: ANDERSON (IND.) • BALTIMORE • BELOIT (WISC.) • BOSTON BRIDGEPORT • CHICAGO • CLEVELAND • DAYTON • DETROIT • GRAND RAPIDS LOS ANGELES • LOUISVILLE • MATAWAN • MILWAUKEE • NEW YORK PHILADELPHIA • PITTSBURGH • PLAINFIELD (N. J.) • ROCHESTER • ST. LOUIS SAN FRANCISCO • SPRINGFIELD (MASS.) • UTICA • WALLINGFORD (CONN.)

H-VW-M

FINEST IN PLATING AND POLISHING PROCESSES • EQUIPMENT • SUPPLIES

ILLCO-WAY
ionXchange



RECOVERY OF CHROMIC ACID FROM ANODIZING RINSE WATER

The block diagram above indicates one method of using ionXchange to save money, in the plating rooms of a large automobile plant, by recovering the chromic acid from the rinse tanks of anodizing operations. The cost of equipment was much less than the cost of a disposal plant, and the savings through recovery were substantial enough to make the investment a very profitable one.

REMOVAL OF ALUMINUM FROM ANODIZING BATH

A secondary purpose for one part of the same installation was the removal of aluminum from the anodizing baths. When the concentration of aluminum in any anodizing tank rose to nearly 1 g. per liter, that tank was cycled through the cation exchanger and the aluminum removed, thus saving over $250 a week compared with partial dumping. *For details on this and many other money-saving applications of ILLCO-WAY ionXchange, write us or consult your Illinois Water Treatment Company representative.*

ILLINOIS WATER TREATMENT CO.
840 CEDAR ST., ROCKFORD, ILLINOIS

ILLCO-WAY ionXchange

NEW YORK OFFICE: 141 E. 44TH ST., NEW YORK 17, N.Y.
CANADIAN DIST. PUMPS & SOFTENERS, LTD. LONDON, ONT.

MEET MR. PRESIDENT*

Burkitt
Portland Branch

We are pleased to introduce our president, Harold Burkitt who has been associated with the plating industry for the past 17 years. Harold came to Portland in 1914 and graduated from the University of Oregon in 1925. For several years he was in the finance business with his father and in 1938 he bought and reorganized Industrial Chrome Plating Works in Portland. He saw a definite need for hard chrome in this area for the pulp and paper industry and as a result his company pioneered the field in the Pacific Northwest. During World War II, Harold added a second shop, Alloy Plating, which has been active in the decorative plating field. Employment in the two shops has reached a total of 35 people.

Much of the original effort in getting this Portland Branch of the AES organized belongs to Harold, and he is today one of the most active supporters of the Branch.

Shimizu
Western Ontario Branch

Yon was born on February 21, 1924 in Victoria, British Columbia. He attended primary and high schools in Victoria and graduated in Chemical Engineering in 1948 at University of Toronto. During his undergraduate years he worked as a plater's helper in a job plating shop in Toronto. On graduation in 1948 he joined Sydenham Trading Co. Ltd., in Wallaceburg as plating chemist. Subsequently, he became plating foreman and was recently appointed plant manager. He is a member of the Association of Professional Engineers of the Province of Ontario. He has been a member of the Western Ontario Branch of the AES since 1949. He was Branch Librarian 1952-54 and was elected President in 1955.

Callahan
Capitol District Branch

Paul D. Callahan was elected president of the Capitol District Branch, AES, during a recent meeting of that group.

Callahan was born in Saratoga Springs, N. Y. He attended public schools there, graduating in June 1937, and received the "Yaddo Medal" for character and scholarship from Saratoga Springs High School. He entered Union College in 1938, and graduated in 1942 with the degree of AB in Science, chemistry major.

P. D. Callahan was first employed by General Electric in 1941. After spending two years in the Army of the United States, Callahan was discharged, and returned to General Electric. He joined the staff of the Materials and Processes Laboratory in 1947, where he is now employed.

Callahan married the former Jane Weglowski, and has one daughter, Kathleen Anne, age 13.

He has been Secretary of the Capitol District Branch since its conception in February 1954.

*Feeling that Branch Presidents are much too much "the unknown man" in the AES, this department has been instituted. As biographies and pictures are received they will be run here.

BRANCH NEWS

BRIDGEPORT

President J. Simon Heads for Sunny California

The regular business meeting of the Bridgeport branch, AES, was held in the main ballroom of the Hotel Barnum on Friday, October 14. President **Joseph Simon** called the meeting to order at 8:30 P.M. at which time there were 30 members and guests present.

Wm. Ehrencrona was reported well on his way back to normal after a siege in the hospital. **Bob Onkey** has been afflicted with a serious attack of bulbar type polio. Indications are that his condition is quite alarming.

Phil Bailin representing the Board of Managers, reported on the results of their request to the N. E. Regional for readmission. The Executive Committee of the N. E. Regional voted unanimously to accept the Bridgeport branch upon the receipt of the sum of $250.00. The Secretary was authorized to cash the Government Bond in order to meet this obligation.

Richard C. Barrett, chairman of the committee representing the branch at the N. E. Regional, selected the following to aid him: **W. Lindsay** vice-chairman, **P. Bailin, R. Coral, G. Eckholm, F. Tatum, C. Bryan** and **G. Haas** alternate.

A report from the Board of Managers concerning the raising of dues was discussed for a short length of time without conclusion. Because of the late starting time and the little time left for the speaker it was decided to postpone further discussion of this issue until the November meeting.

After many attempts by president Joseph Simon to appoint a chairman for our annual Christmas Dinner Dance, **Frank Richard** volunteered his services. Because a financial loss at this time is definitely undesired, tickets to this affair would be sold in advance with a definite closing date. If insufficient support is indicated by the returns, cancellation of the event is in order.

William Ehrencrona was appointed chairman of Old Timers Night. R. Barrett offered to underwrite any losses exceeding $100.00 incurred at this affair.

Al Ferguson made a motion that all committees be appointed at the beginning of the fiscal year. It was so voted.

Feguson then volunteered to be chairman of the Christmas Dinner Dance scheduled for some convenient date in December 1956.

At 9:45, the meeting was turned over to **Michael Tamas**, our librarian, who introduced the featured speaker of the evening, **Edward C. Rinker** of Sel-Rex Precious Metals Co., of Belleville, N. J. Rinker, with the effective use of both colored and black and white slides, compared the deposition of gold from a so-called conventional one with that formulated by the Sel-Rex Co. The principal difference as pointed out by Rinker seemed to be in the higher metal content of the proprietary bath. Samples of barrel plated gold parts, all to close tolerances, were passed around for inspection. In addition to that each of the members were recipients of a very attractive finger nail clip plated with Sel-Rex's gold. After a brief question and answer period Rinker received a rising vote of thanks for his splendid efforts.

Adjournment time disclosed the fact that our president Joseph Simon had accepted a very lucrative offer from an electronics corporation in sunny California, and that this is the last meeting at which he would preside. All the members wished him well in his new enterprise. Refreshments were served.

BOB PARKER,
Secretary-Treasurer

COLUMBUS

Tin Alloy Plating by R. M. McIntosh

The regular monthly meeting of the Columbus branch, AES, was held at Battelle Memorial Institute on Friday, October 7.

Following a movie entitled "Steel Making," the business meeting was called to order by president **Nathan Koslin.**

The minutes of the September meeting were read and approved.

Candidates **Ralph Watson** and **Harlan Jones** were duly approved and elected as members of the Columbus branch. Candidate **Kenneth Cave** was proposed for election at the November meeting.

A motion to adjourn the business meeting was carried.

Librarian **Harry Moore** then introduced the speaker of the evening, **R. M. McIntosh** of the Tin Research Institute, whose subject was "Tin Alloy Plating."

After an interesting question and answer session, cider and donuts were served by **Don Swickard.**

MICHAEL FARR, JR.,
Secretary

CENTRAL MICHIGAN

A Dinner, A Door Prize, and A Discussion

The Central Michigan branch met on Tuesday, October 11, at the Hotel Hayes in Jackson. After dinner, a door prize was won by **Lenard Reiman,** and a letter of resignation from the AES was read from **R. L. Carter.** He has been forced to take this course of action because of a change of jobs.

The speaker of the evening was **R. W. Parker** of the Michigan Water Resources Commission. Parker felt that the members would get more out of the evening if he led a discussion instead of presenting a formal speech. Because of this, all those present were able to get direct answers to specific problems in their own plants. At the end of the session everyone felt that the discussion had been a huge success and Parker received a rising vote of thanks.

G. S. WOODRUFF,
Publicity

DAYTON

Dr. Baldwin Explains a New Theory of Hydrogen Embrittlement

The regular October meeting was replaced by a joint meeting with the Dayton Chapter of American Society for Metals, held at the Engineers' Club, October 12. This was a dinner meeting. The dinner was followed by a short film on mountain climbing in the Alps. The technical session for the evening, "Hydrogen Embrittlement," was presented by **Dr. William Baldwin, Jr.,** Case Institute of Technology. Dr. Baldwin is Research Professor and Director of the Metals Research Laboratory of the Department of Metallurgical Engineering. Fifty-eight were present for the dinner and about 80 attended the technical session.

A new theory on hydrogen embrittlement was given. This theory evolved as a result of tensile strength tests conducted at various temperatures and rates of elongation. Briefly described, it is the hydrogen in the voids and not the hydrogen in the solid solution that causes embrittlement. Annealing to de-hydrogenize merely shifts this hydrogen to the solid solution where it is readily soluble. Upon cooling this hydrogen may diffuse back but under extreme difficulty. In the case of plating the hydrogen is contained mostly in the outer shell and upon cooling reduces by diffusing to the solid solution bringing about a lack of brittleness. This theory states that only a very small amount of hydrogen, 2 to 3 per cent, actually out-gasses from the specimen. Dr. Baldwin was given a rising vote of thanks for his able presentation. The intense interest in this theory was shown by the numberous questions.

After the meeting we were treated to coffee and doughnuts through the courtesy of the Dayton Chapter ASM.

RICHARD M. CLINEHENS,
Secretary

"TREMENDOUS HELP"

"Your course has been a tremendous help to me in my work," writes plating foreman Elton Larson of Sturgeon Bay, Wis. You too will find this phenomenal home study course in modern electroplating a tremendous help in your work, whether you're a tank man or a top executive! Write today for free details. Joseph B. Kushner, Electroplating School, 115 Broad Street, Stroudsburg 1P, Pa.

USE READER SERVICE CARD; INDICATE B 1205.

PLATERS ATTENTION—60% OFF

•

Fused Silica Immersion Heaters
New discontinued models

•

2010—2kw, 230 V, 20" long . . . $36.00 W/Boot $61.00
3015—3kw, 230 V, 25" long . . . 44.00 W/Boot 69.00
4515—4.5kw, 230 V, 25" long . . 57.00 W/Boot 87.00
5520—5.5kw, 230 V, 30" long . . 66.00 W/Boot 96.00

60% off above prices, while they last.

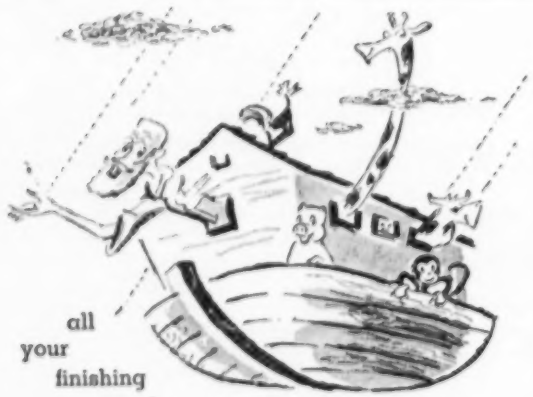
Crucibles, tapered, 5 pint, seconds $4.00 each.

Terms: Net, fob shipping point

PYROSIL FUSED SILICA for INDUSTRY

Pyrosil, Inc., Cuyahoga Falls, Ohio

USE READER SERVICE CARD; INDICATE B 1206.



all your finishing needs **UNDER ONE ROOF**

J. Holland & Sons offers you the most comprehensive operation in the entire finishing industry. Because we maintain one of the world's largest in-stock supplies of polishing, plating and spray equipment, we can deliver in-stock merchandise immediately upon your request.

You can forget about the problems of buying your requirements from numerous sources. Get dependability, complete satisfaction and "one-stop" buying from under our large roof!

Our engineering and technical staff is ready to assist you in solving special problems. We'll be glad to help!

J. HOLLAND & SONS, INC.

leaders in finishing equipment for over half a century

475 KEAP ST. (corner Union Ave.) BROOKLYN 11, N. Y.

BRANCH NEWS

HARTFORD

Ultrasonics by Stanley Rich

The regular branch meeting was held at the Bond Hotel on October 17 with about 64 members and guests present. Prior to the meeting a movie entitled "Courage in Connecticut" was shown.

Rich

The guest speaker for the evening was **Stanley R. Rich,** Vice-President and Technical Director, of the General Ultrasonics Company, whose subject was "Ultrasonics As Related to Electrodeposition."

Rich explained practically how ultrasonics work in plating, pickling, electropolishing, cleaning, etc. Due to cavitation (a shearing or suction force) of the fluid media which occurs mainly on the surface of the metal. It has its place in the plating field due to action without motion, as for example, in still baths where no agitation is used. Ultrasonics reduces polarization or eliminates it; higher current densities can be used improving throwing power and giving better plate distribution. Work has been done on cadmium, zinc, copper and nickel plating baths and a limited amount of information is available on chromium baths. On silver and gold baths, results to date have been not too good. Ultrasonics may have applications in reducing hydrogen embrittlement and chromium stripping.

The talk was illustrated with slides and a practical demonstration of cleaning and nickel plating by ultrasonics was given the audience.

The technical chairman for the evening was **Arthur Logozzo.**

STANLEY PLATOZ,
Secretary

INDIANAPOLIS

Another Class is Planned

Even if the weather was very rainy, the membership of the Indianapolis branch was well represented when 50 attended the November 2 meeting at Fox Steak House. After the usual opening of introductions, secretary and treasurer's reports, the following were voted into the branch as new members: **Robert H. Gwynn,** Indianapolis; **Daniel E. Chegar,** Kokomo; **Thomas N. Clark, Jr.,** Bloomington; **William V. Pitkin,** Indianapolis; and **William B. Spall,** Indianapolis. This motion was made by **Les Reynolds,** seconded by **Jack Vaughan** and carried. Clark, Pitkin and Spall were in attendance and were introduced to the group.

Our president, **Herb Kennedy,** reported on the Tri-State regional plans. Discussion followed about the By-laws and a motion made by Vaughan and seconded by **Tom Evans** that the Indianapolis branch accept the By-laws with the Dayton branch Amendment. This motion was carried.

Marshall Whitehurst, chairman of the "Paper Committee," reported that he is gathering information on the subject "Filter Media," but he needs help on this. Our president will appoint some members to help him.

Abraham Max reported on the organization of a class in plating. Since it is late for a September class, we could consider organizing class for mid-year or next fall. Several ideas came up and much discussion followed. Doc Max will report later on this subject.

Plans for our annual meeting are progressing but no definite information can be given at this time except the date which is April 28, 1956, at the Indianapolis Athletic Club.

The 1956 meeting of our branch at Columbus, Ind., is being planned now and Evans is chairman. In a motion by **Elmer Lundberg** and seconded by **Frederick Anderson,** it was moved that up to $150.00 be appropriated for a program if needed. This was carried.

CONTROLLED GRAIN SIZE: APW Extrusion Process* controls grain size within definite limits—*minimizes shedding!*

ROLLED FLAT PLATE ANODE SECTION:

This Photomicrograph shows highly irregular, uncontrolled grain size—a major cause of shedding and resultant rough electrodeposits.

APW EXTRUDED ANODE SECTION:

Note small, fully controlled regularity of grain size that promotes uniform corrosion, smoothest electrodeposits, less rejects.

*Pat. Pending

NEW! SHAPED, EXTRUDED APW SILVER ANODES

STANDARD SHAPES:

"RECTANGULAR" "TEAR DROP" "DOG BONE"

The common problem of shedding and all of its costly results in electroplating can now be virtually eliminated with the radically new extruded, shaped silver anodes made by an exclusive APW-developed process.

The small and uniform grain size produced in the new APW extruded anodes is controlled between definite ideal limits as illustrated above. As a result, corrosion is *smooth and uniform*—with consistently smooth electrodeposits. Rejects are a comparative rarity.

The new APW extruded anode provides equally important advantages by redistribution of mass metal in scientifically determined shapes. While conventional rolled flat plate anodes quickly wear to a sharp knife edge from which silver particles break loose readily, APW shaped anodes maintain substantially rounded edges for practically the complete life of the anode. Anode area is also appreciably prolonged. After 85% by weight has been plated off, *this APW anode retains 80% of original active surface area!* You profit with the longer, useful life of the anode . . . polarization is minimized . . . there is less silver scrap to be refined.

APW will develop special anode shapes to meet particular plating bath conditions. You are thus assured of utilizing the silver you buy in anodes most efficiently. Feel free to consult us on any anode problems you may have. ★ ★ ★

THE AMERICAN PLATINUM WORKS

APW

231 NEW JERSEY RAILROAD AVENUE • NEWARK 5, NEW JERSEY

Anode Bags · Baffle Bags
Basket Saver Bags
OF EXCEPTIONAL PURITY AND UTILITY
• ALLIED bags are standard throughout the country, yet are lowest in price.
• Material especially known for strength treated for removal of starches, plastisizers, and leaf.
• Anode bags of cotton nylon, vinyon, orlon, dynel and polyethylene.

ALLIED INDUSTRIES CO. 18400 MT. ELLIOTT AVE. DETROIT 34, MICHIGAN
We make more anode bags than all other makers combined

USE READER SERVICE CARD; INDICATE A 1265.

LOOKING FOR A BETTER FINISH?

4A

TAILOR-MADE
BUFFING AND POLISHING COMPOUNDS
for Aluminum, Brass, Copper, Stainless Steel, Carbon Steel, etc.
CAKE, DIP AND SPRAY
CEMENT AND THINNER
for setting up wheels, belts and rolls
HARRISON & COMPANY, INC.
HAVERHILL, MASSACHUSETTS

USE READER SERVICE CARD; INDICATE A 1266.

For Metal Finishers!
Pressure Moulded NEOPRENE "CAPLUGS"

7 STANDARD SIZES

	A	B	C	D	E	F	G
TO PLUG HOLE SIZE	1/8-3/16	3/16-1/4	1/4-5/16	5/16-1/2	1/2-5/8	9/16-11/16	5/8-3/4
TO CAP STUD SIZE	3/32-5/32	5/32-3/16	3/16-1/4	1/4-5/16	5/16-3/8	3/8-7/16	5/16-1/2

MASKING PROBLEMS OUR SPECIALTY!
WRITE FOR FREE SAMPLE KIT...
DUGGAN Masking Devices
2030 WEST FORT STREET
DETROIT 16, MICHIGAN

BRANCH NEWS

The speaker for the evening was **Richard Hafer** of Reynolds Metal Company of Louisville, Ky. Hafer's topic was "Anodizing." Since this is a very large field in finishing at the present time, his talk was one of great interest.

After a brief introduction of what anodizing is, he gave the types of oxide films formed on aluminum. They are first, the nonporous oxide film; second, a film which has considerable surface porosity and third, a film which can be developed by anodic reactions on aluminum which is dissolved immediately on formation by the electrolyte. This is associated with the electropolishing of aluminum. Process procedures were given along with coating thickness, abrasion resistance, corrosion resistance and strength of the film. Hafer showed many slides which were diagrams of the processes. Many colored slides were included showing the many colors obtained in anodizing. Many questions were asked by the group and Hafer was very capable when it came to answering them.

EDNA ROHRABAUGH,
Secretary

MELBOURNE

Dale Addresses 100th Meeting

The 100th regular meeting was chaired by president **Tikotin**, there being 55 members and friends present.

The new Badges of Identification for Meetings were distributed for the first time.

H. Merton was appointed as our representative to the Australian Standards Association.

H. Teague introduced **J. Dale,** Head of the Electroplating Group of the Defence Standards Laboratories, Maribynong, who then gave a lecture on "Controls for Continuous Electroplating." Dale first dealt in a general way with the controls required in electrodeposition procedures. Although the main control of composition at times requires much skill and chemical knowledge it is still essentially a manual control, although occasionally control of some single factor, e.g. pH, can be made automatic by appropriate instrumentation. As the degree of automatic control increases so also does the need for safety devices which are usually interlocked to cover all possible contingencies and protect from loss or damge in the event of failure of the controls. We arrange all controls as far as possible to fall safe.

Dale then described and illustrated the plant and procedure developed at Maribynong for the electrodeposition of low oxygen chromium of high purity, suitable for use in the preparation of alloys with high creep strength at elevated temperatures. Chromium of oxygen content 0.01–0.02/. is obtained by deposition on a steel cathode. The metal is deposited from a solution of CrO_3—100 gal sulphuric acid 4.5 gal, at a temperature of 85 ‡ 0.5° C. The numerous devices to insure safe and continuous operation under the specified conditions were explained fully. Vitreosil heaters, tantalum cooling coils, continuous automatic distilled water supply, automatic liquid level controls, safety tanks for leaks, safety power cut-off arrangements through interlocked controls, e.g. with exhaust fan, and spray collectors which also serve as heat and solution economizers, were all in use.

A short but interesting discussion followed and the meeting closed with a vote of thanks moved by **H. Littauer.**

MILWAUKEE

Pinner Honored; Talks on AES Research Project No. 15

On Friday, October 11 president **H. Tessman** gavelled the regular meeting to order with approximately 50 people present. The minutes of the last meeting were approved as read by the secretary. The auditing committee report was given by **H. Bornitzke** and the annual meeting report was given by **F. Anderson.** Both were accepted by the membership as given. **G. Schwemer** announced that the annual Pabst meeting would be held in June rather than in March. Schwemer was also pre-

Pinner

sented with a past president's pin for his fine job of last year. **L. Diveley** spoke about the shortage of nickel and urged the local nickel users to write their congressmen about getting the platers some nickel to use.

Seven applicants were accepted as new members and they are: **Frank Walker, Robert Yackley, Ben Coughlin, Kenneth Meyer, Wm. Duckworth, Donald Kotz,** and **Elmer Schultz.**

The librarian **J. Severson** introduced the speaker for the evening **A. H. Pope,** Pennsylvania Salt Mfg. Co., who spoke on "Trouble Shooting in Metal Cleaning Operations." After an informative discussion and question period the meeting was adjourned. Those present enjoyed refreshments through the courtesy of the Pennsylvania Salt Co. and J. Schneider & Co.

On November 4 the Milwaukee branch held its annual dinner meeting in honor of **Walter Pinner.** This 22nd Annual dinner was held at the North Hills Country Club and a large turnout of members welcomed Pinner. Cocktails preceded the dinner and afterwards those present enjoyed short talks by football stars **"Buckets" Goldenberg** and **Cecil Isbell.** Judge **Wm. O'Neill** also gave a short talk before Walter Pinner told of variations and modified tests in a short speech on the AES Research Project No. 15. Colored slides supplemented Pinner's comments.

Two applicants were accepted as new members and they are: **Jerome Orcholski** and **Jack Berg.**

After a short business meeting the membership retired to the Tap Room to renew and recall past meetings with Pinner.

C. Peter,
Secretary-Treasurer

MISSISSIPPI VALLEY

A New Branch Reports

The October meeting of the newly organized Mississippi Valley branch was held at the Tower Restaurant in Moline, Ill. on October 19. It was preceded by a dinner which attracted 19 persons. Thirty-one attended the meeting which featured **Ray Stricklen** of Allied Research Products who gave a fine talk on "Chromate Conversion Coatings."

Paul G. Chamberlain,
Secretary

NEWARK

Tin Alloys for Nickel; Ge Rectifiers

The meeting was called to order by president **Austin.** Tom Austin reported plans well along for the Christmas Party on December 17. **Dodd Carr** reported the Electroplating School moving along nicely with 41 registered and an attendance of 90–100 per cent each evening.

Dr. Fred Lowenheim of Metal and Thermit chose as his timely topic "Tin Alloy Deposition," particularly emphasizing the tin-copper (12–88 per cent) alloy which he claimed better than copper under chromium, was almost as easy to plate as copper and almost as cheap. He mentioned that claims have been made that tin-copper bronze may be substituted mil for mil for nickel. Fred also briefly outlined the work on Section E of ASTM B-8 Committee concerned with performance of tin and tin alloy coatings. Corrosion will not be the first study; instead solderability is scheduled and first a solderability test is necessary.

C. S. Hague of the Westinghouse Electric Corp. discussed "Germanium Rectifiers." He first of all pointed out that avail-

FOR SALE
Slightly Used BUFFS
Loose and Sewed
Air-Cooled
Any Quantity
MICHIGAN BUFF CO., INC.
3503 GAYLORD AVE. DETROIT (12), MICHIGAN
USE READER SERVICE CARD; INDICATE A 1268.

ACID-ALKALI-PROOF CONSTRUCTION
CHEMSTEEL CONSTRUCTION COMPANY, INC.
SEND FOR FREE DATA ON
ACID-ALKALI-PROOF CONSTRUCTION
And see how Chemsteel's experience in the steel, chemical, textile and food industries can solve your corrosion problem economically, quickly, and correctly!
303 Chemsteel Bldg., Walnut St., Pittsburgh 22, Pa.
USE READER SERVICE CARD; INDICATE A 1269.

RESISTS ACID, ALKALIES, SOLVENTS
RESISTS ABRASION, IMPACT
COSTS LESS THAN ACID-PROOF BRICK
4 TIMES STRONGER THAN CONCRETE
NEW CORROSION-PROOF SURFACING FOR FLOORS

COROCRETE
provides greater protection than conventional acid-proof floor materials . . . at considerable savings.
Recommended for use in chemical processing, food processing, plating and metal working industries, COROCRETE is quickly and easily applied over existing concrete surfaces . . . handles like cement topping.
Write today for trial sample of COROCRETE
6461-CC
THE CEILCOTE CO., Inc.
Corrosion-Proof Material and Construction
4842 Ridge Road • Cleveland 9, Ohio
USE READER SERVICE CARD; INDICATE A 1270.

Zialite
Reg. U. S. Pat. Off.
for NICKEL PLATING
The one bath especially designed for plating DIRECTLY on ZINC, LEAD, ALUMINUM, BRASS, COPPER and IRON.
for HARD CHROMIUM
USE Zialite ADDITION AGENTS
Harder deposits. Increased throwing power. Less sensitivity to sulfate content. Exceptionally fine results plating anything calling for Decorative or Hard Chrome.
ZIALITE CORPORATION
92 Grove Street Worcester 5, Mass.

USE READER SERVICE CARD; INDICATE A 1271.

IMPROVE YOUR PLATING
WITH PERIODIC-REVERSE UNITS
OF FINEST QUALITY

UPA
WRITE FOR INFORMATION
UNIT PROCESS ASSEMBLIES, INC.
Mgrs. of Periodic-Reverse Units and Electronic Controls for the Plating Industry
75 East Fourth Street New York 3, N. Y.

USE READER SERVICE CARD; INDICATE A 1272.

BEAM-KNODEL CO.
Distributors for
HANSON-VAN WINKLE-MUNNING CO.'S
"PLATEMANSHIP"
A Complete Service for
ELECTROPLATING
POLISHING AND BUFFING
CLEANING AND ANODIZING
CA 6-3956-7 • 195 Lafayette Street, New York 12, N. Y.

USE READER SERVICE CARD; INDICATE A 1273.

LATE TYPE EQUIPMENT
1—Udylite Junior Full Automatic for cyanide plating.
1—Ransomatic Cleaning Machine.
1—Chandeysson 1000 ampere 45 volt Synchronous Motor Generator Set.
1—HVWM Full Automatic for Nickel.
WRITE—WIRE—PHONE COLLECT
BAKER BROS., INC.
564 E. First Street So. Boston 27, Mass.
ANdrew 8-9290

able methods for transforming alternating current to direct current had limitations, electron tubes (11–12 volt drops), mechanical (new and many problems), selenium and copper oxide rectifiers (poor life and efficiency), motor generators (costly and require maintenance). He stated the new germanium rectifier had high efficiency, long life and low maintenance. Hague compared the normal conductor with the semi-conductor and pointed out the function of impurities in semi-conductors and the extreme purity of semi-conductor materials; the preparation of pure germanium (zone refining and single crystal formation) the formation of p and n type junctions (indium and antimony introduction) and the mechanism whereby germanium junctions work. Present junctions are available at 20 amperes at 32 volts and these may be combined to yield any d-c output desired, e.g. 24 junctions yield a rectifier rated 4000 amperes at 24 volts.

Among the visitors was AES executive secretary **Peter Kovatis.**

A number of questions after the formal talk directed to both speakers indicated the general interest of the more than fifty present in the two subjects.

D. Gardner Foulke,
Secretary

NEW HAVEN

Get Out to Those Meetings;

The October meeting was held on October 11 in the Mason Laboratory, Yale University.

President **Bill Murray** called the meeting to order at 8:30 P.M. at which time approximately 30 members and guests were present. A larger turn-out of our membership is imperative for the proper functioning of the branch. It is requested that all members make special effort to get to the monthly meetings. The active membership can do much in this respect by personal contact with those in their own particular localities.

The business discussion covered the progress made at the first Regional Business session, a committee report on the Christmas party and the announcement that past president **Ed Busby** was laid up because of an automobile accident. The sick committee was advised to take proper action in this matter.

The applications of two new members, **Nicholas Ismailoff** and **Albert Welling** were read and accepted.

Technical chairman **Charles Kuster** then introduced the speaker of the evening, **Hubert M. Goldman** of Enthone, Inc. who gave a scholarly talk on the "Stripping of Metallic Finishes." Hubert has had a vast experience in this field and covered the wide range of strippers and stripping conditions in a highly educational manner.

Bernard J. Gaffney,
Secretary

PHILADELPHIA

An Affiliation and a Changed Meeting Date

The first meeting of the 1955–56 season was held at the Engineers' Club, with 60 attending. As a result of a letter ballot the branch members voted almost unanimously to affiliate with the Engineers' Club of Philadelphia and to change the regular meeting night from the fourth Friday to the fourth Monday of the month. This move assures the branch of adequate meeting facilities with many other advantages.

Benjamin Barnes was elected to fill the unexpired term on the Board of Managers created by the resignation of **Alfred H. Pope.** The printed program of the branch 1955–56 meetings was distributed to those present with comments on it by branch president **Trusdell.** The secretary read the names of those suspended for nonpayment of 1955–56 dues and asked the members

to contact those known with the view of getting them to pay up and be reinstated.

Heiman

First Vice-President **Samuel Heiman** gave a concise blackboard lecture on the organization and activities of the AES. The annual George Gehling Memorial Lecture was delivered by **Dr. Edgar J. Seyb,** United Chromium Division and was on "Crack Free Chromium." He, with the aid of slides, gave complete information on the physical properties, corrosion resistance and applications of this recent development in chromium plating.

I. Wm. Marcovitch,
Secretary

PITTSBURGH

Bowerman on Plated Wiring

Monthly meeting of the Pittsburgh branch was held at the Sherwyn Hotel's Alleghany Room on October 5. The meeting was preceded by a fine dinner at which 24 attended. An innovation was made by the branch to stimulate attendance at dinners, two or three free meals each month, but winners have to be present to get the prize.

Bowerman

At the short business meeting we were pleased to welcome two new members into our branch, **Sirwell E. Johnson** and **Earl Johnson** and accept the applications of four prospective members, **Elmer A. Lord, A. John Cornish, Collin F. Stevens** and **Ty Nitsche.** We were hosts to four guests for the evening. The proposed changes and additions to the Branch By-Laws were discussed and unanimously passed.

Since the branch president was indisposed, the 1st vice-president **Myron Ceresa** handled the meeting. After the customary committee reports the meeting was turned over to librarian **Jim Crain.** He introduced our speaker for the evening, **Edwin R. Bowerman** of Sylvania Electric Products, Inc., who talked on "Plated Wiring." This excellent talk in a new field of electroplating proved most interesting to the members as evidenced by the number of questions and especially the interest in the samples Ed displayed at the conclusion of his talk.

During the short pause for refreshments, Ed drew the name for the door prize. **Richard E. Woehrle** was the fortunate winner of a beautiful set of Revere Stainless Steel cooking bowls and pans (for his wife) presented by **Bob Burford** of Pennsalt.

Herb Schram,
Secretary

PROVIDENCE-ATTLEBORO

Dr. Parker on Cleaning

The Providence-Attleboro branch of the AES met October 17 at 195 Angell Street for the regular monthly meeting. **Dr. Parker** opened the session at 8:20 P.M. He introduced **Kubus** of the Wyandotte Technical Service Department for a talk entitled "Advancement In Cleaning."

Cleaning for plating is a very exacting operation and soil must be removed to the extent of one molecular layer for some types of deposits. More trouble can be traced to cleaning than any other plating process.

Used by Platers, Silversmiths, Jewelry Manufacturers, Makers of Watches, Clocks and Electronics and other metal finishers.
Supplied in straight or crimped brass, steel or nickel silver wire in sizes .0025 to .006
Also available in Stainless Steel, Bristle, Fibre or Nylon
Special sizes and shapes to order.
Write (Dept. E) on your letterhead for catalog and price list.
DIXON & RIPPEL, INC KINGSTON, N. Y.
USE READER SERVICE CARD; INDICATE A 1275.

Complete Line of **SISAL BUFFS**
BIAS-CONVENTIONAL AND
BIAS METAL CENTER IN 5"
AND 7" CENTERS
"As Good As Any—Better Than Most"
Chase **BUFF CO.**
3506 HEATHCOTE AVE., NEW YORK 69
Telephone FAirbanks 4-7570
ATTENTION JOBBERS: We have choice territories available.
Call or write today.
USE READER SERVICE CARD; INDICATE A 1276.

SOME FINISHING ENGINEER
can find that Lifetime Job
at rapidly-growing
STROMBERG-CARLSON

The man we want preferably has a Chemical Engineering degree and is definitely expert in electroplating and organic finishing. He will possess a thorough knowledge of plating, lacquering and enameling equipment and of the construction materials for plating rooms and the like. BUT—he hasn't found his real spot yet. Maybe we have it!

Rochester, in the beautiful Finger Lakes region, is one of the East's ideal home cities. And Stromberg-Carlson, newest division of General Dynamics Corporation, is a blue-chip industry. Send a resume at once to

Fred Ciambrone, Telephone Production Engineering

STROMBERG-CARLSON COMPANY
Rochester 3, N. Y.

USE READER SERVICE CARD; INDICATE A 1277.

BRANCH NEWS

Buffing compounds present a particularly difficult problem in that the solid compounds may not be made of entirely water soluble materials and temperatures up to 1200° F. during buffing change the original materials to extremely stable substances. Aging of residual compounds on buffed surfaces increases the difficulty of removal.

Different base metals require different cleaning cycles to achieve the best and most economical results. The most common base metals are: brass, copper, zinc die casting, and steel.

Soak and spray cleaning combined with cathodic and anodic electrocleaning are the major methods of ridding metal surfaces of unwanted dirt. The proper use of an acid dip is also necessary.

Soils, when carried into plating baths, can result in many troubles. Among them are blisters and peeling, roughness, pitting, and other undesirable defects.

Several tips for tracking down undesirable plate are: 1. Look at work after each step, 2. Check concentrations and temperatures of baths, 3. Look for accidental changes in preparatory cycle, and 4. Try plating a piece that has been hand cleaned with pumice.

A rising vote of thanks was given to Kubus.

F. L. Sherman,
Secretary

ROCHESTER

Brumbaugh on Phosphating and Painting

The October meeting of the Rochester branch was held at the 40 & 8 Club on October 17. Present were 28 members and guests.

Plans for the November 5 Bowling Party were discussed and a complete treasurer's report submitted to the branch.

The business session was then adjourned and the meeting turned over to our librarian, **Frank Beuckman,** who introduced **George Brumbaugh** of the American Chemical Paint Company, who spoke on phosphating and painting, as well as preparation of base metal and types of equipment used. A question and answer period followed.

The meeting was then adjourned in favor of refreshments and friendly discussions.

Frederick L. Johnson,
Secretary

ROCKFORD

Annual Education Session on April 21

The October meeting of the Rockford branch, AES, held at the Faust Hotel found the officers and the members enthusiastic and inspired to new activities after their summer of rest. President **Foley** opened the meeting in the usual manner by having each one present rise giving his name and company affiliation.

We were pleased to welcome **Floyd Pbybylinski** as a new member to our branch.

A short business meeting followed including a report by **LeRoy Johnson,** chairman of the Annual Picnic held in June. Also by **Harold Gustafson,** chairman of the Golf Plae-Dae held in September at Manh-Nah-Tu-Su Country Club. Both functions were very well attended and proved very successful.

April 21 was decided on as the date for the Annual Educational Session and Banquet. This to be held at the Faust Hotel.

The meeting was then turned over to librarian **Laurence Ray** who introduced the speaker for the evening, **Carl Person,** district manager for Turco Products Inc., who showed a film entitled "Inspection using the Die-Check Method." Along with his commentary this proved to be a very interesting presentation, and was very well received. A lively discussion period followed.

E. J. Budden,
Secretary

Announcement!

MAPLEWOOD COMPANIES

has been appointed

DIRECT FACTORY REPRESENTATIVES

for

THE PACKER MACHINE COMPANY

MERIDEN, CONN.

Exclusive Manufacturers of

Packer-Matic

AUTOMATIC POLISHING & BUFFING MACHINERY

These machines are designed to perform a multiplicity of jobs automatically with versatility and efficiency. If you are interested in solving your plating and buffing problems and in cost reduction . . . telephone this number . . . MURDOCK 8-4150.

Maplewood will represent in the following areas:

NEW YORK STATE • NEW JERSEY • EASTERN PENNA.
DELAWARE • MARYLAND • VIRGINIA • DIST. OF COLUMBIA
NORTH CAROLINA • SOUTH CAROLINA • TENNESSEE
GEORGIA • ALABAMA • MISSISSIPPI • FLORIDA

Maplewood

COMPANIES

P. O. BOX 113 MAPLEWOOD, N. J.

1574 USE READER SERVICE CARD; INDICATE A 1278.

Season's Greetings

. . . to our many friends and clients in the metal finishing industry. For the pleasant associations and your contribution to a successful year . . . we thank you.

from the manufacturers of

THE *Pressure-Cooled* BUFF

•

PRODUCTS BY UB UNITED BUFF

UNITED BUFF PRODUCTS corporation

233-241 OAK STREET, PASSAIC, N. J.

WAREHOUSE STOCKS IN PRINCIPAL CITIES OF U. S. AND CANADA FROM COAST TO COAST

NOTICE: *The Pressure-Cooled Buffs and Aircon Wheels are covered by U. S. Patents 2,519,275 and No. 2,637,957. Other U. S. and Foreign patents pending.*

USE READER SERVICE CARD; INDICATE A 1279.

BRANCH NEWS

SAGINAW VALLEY

Munn on Fishing and Football

The September meeting was held at Zehnders Hotel in Frankenmuth on the 14th.

Seventy members and guests were present to hear **Clarence "Biggie" Munn,** Athletic Director at Michigan State University, talk on football and fishing. He also showed two films on fishing and outdoor life he took while fishing in Canada.

A door prize was donated by Wagner Brothers of Detroit.

The Saginaw Valley branch of the AES met for their October 12 meeting at Zehnders in Frankenmuth. Fifty-two members and guests attended to hear the Glidden Co. discuss "The Future of Organic Finishing." **Jack Waldron,** sales manager of the Cleveland territory, and **Eugene Weith,** technical representative, were the guest speakers.

A door prize was given by United Chromium and was won by **Patrick Kehoe.**

ALFRED KNIGHT,
Recording Secretary

ST. JOSEPH VALLEY

Dr. Max Tells of the Present; Dr. Saltonstall Peers into the Future

The October 5 meeting was held at the L. H. Inn in Mishawaka, Ind. Thirty-nine members and guests attended the dinner; 42 were present at the technical session.

The meeting opened with an introduction of members and guests. This was followed by a 10 minute question and answer period. President **Brouwer** appointed a committee to continue the campaign for **Duke Wysong** for 3rd Vice-President in 1956. The committee members are: **Eugene Roth,** chairman; **John Lockerbie, Dr. E. Wilhelm** and **Dr. H. J. Wiesner.**

R. H. Anderson was elected to membership in the branch.

Our librarian, **Ray Dearth,** then introduced the speaker for the evening, **Dr. A. M. Max** of the Record Development Laboratories of the R.C.A. Victor Division. Dr. Max talked on "The Contribution of Electroplating to High Fidelity Records." He explained the method of making phonograph records starting from the original recording on the nitrocellulose lacquer. Slides were employed to show photomicrographs of sound grooves of 78, 45, and 33⅓ rpm. The lacquer cutting is duplicated by an electroforming process. The sequence is as follows: 1. Silvering of the lacquer, 2. Thin nickel, 3. Heavy acid copper (0.020"). The heavy "master" is stripped from the lacquer. The nickel surface is passivated to prevent sticking, then nickel and copper are plated. The nickel to nickel faces are separated and thereby a second metal "mould" is produced. This electroforming process may again be repeated as many times as necessary to produce further metal "moulds." From the moulds, metal stampers are electroformed. The stampers are chromium plated to give a better wearing surface.

Slides were shown to depict the other sequence of operations in the actual manufacturing of records.

Major contributions to recording manufacturing have been the controlling of stresses in the nickel and the impurities in the bath. These improvements along with recording and cutting improvements have made possible high fidelity records. If the impurities are controlled to levels listed as iron, 10 ppm and copper, 5 ppm, the stress is then less than 15,000 psi.

Nickel is plated 0.007 inch–0.010 inch thick. Lower stress values may be obtained by use of organic addition agents. Continuous "dummying" of the nickel bath along with high rate of filtration (5 times/hr) are used to help maintain the higher purity

☆

A magnetic thickness tester . . .

POCKET **HANDI-GAGE**

Tests thicknesses from 0.0001 to 0.015 inch. Each individual gage is separately calibrated to National Bureau of Standards thickness plates, resulting in an accuracy to 10% for thicknesses over 0.0002 inch. As simple to use as an automobile tire gage, the Pocket Handi-Gage may be used on the production line or in the laboratory. It's perfect for use as a "Go, No-Go" thickness gage at the plating tank or spray booth.

NO BIGGER THAN A FOUNTAIN PEN, BUT WHAT A JOB IT DOES!

Tests brass, cadmium, copper, lead, nickel, silver, tin, zinc, lead-tin and zinc-tin alloys, hot dipped tin and zinc, paint, plastic laminations, enamel and lacquer on steel and other magnetic metals. Gives results in SECONDS. Especially adapted for hard-to-reach areas. Comes in a pocket-sized case complete with magnets for various thickness ranges.

Platers Research CORPORATION

50 E. 4TH STREET
NEW YORK 3, N. Y.

USE READER SERVICE CARD; INDICATE A 1280.

SEELEY
BUFFING COMPOUNDS
REFLECT THE DIFFERENCE

Assured Economy
Dependable Uniformity

Bar — Liquid — Greaseless
Tumbling Abrasives

E. E. SEELEY COMPANY, INC.

Bridgeport 1, Conn.

USE READER SERVICE CARD; INDICATE A 1281.

Here's the best shortcut in the field of electroplating

One operation usually removes rust and oil at the same time. One alkaline tank may remove oxides, drawing compound residues and other stubborn soils . . . even strip zinc and cadmium from rejects and racks.

Sensational Oakite Rustripper frequently eliminates acid pickling and its troublesome after-effects: (1) hydrogen embrittlement; and (2) smut that must be removed by electrocleaning or hand brushing.

FREE Our illustrated booklet tells how this shortcut may save you time and money—in tank lines, in automatic platers, in barrel lines—by saving equipment, floor space, acids, water, steam and electricity. Write or send coupon for your copy.

OAKITE PRODUCTS, INC.
40 Rector Street, New York 6, N. Y.

Send me a FREE copy of your booklet *"Here's the best shortcut in the field of electroplating"*

NAME_____

COMPANY_____

ADDRESS_____

OAKITE. Technical Service Representatives in Principal Cities of U. S. and Canada

BRANCH NEWS

of the electrolyte. Diaphragms in nickel baths are helpful. Improvements in techniques have been made so that relatively little deterioration in quality results from the first record to the 1,000th or 2,000th record.

Many questions were asked of Dr. Max, which enhanced the very enjoyable talk that was presented.

Forty-three members and guests attended the dinner and technical session of the November 2 meeting of the AES.

Minutes of the October 5 meeting were read and approved. Application for membership from **John Kimble** was accepted. Letters from **Trusdell** of Philadelphia and **P. Kovatis** were read.

Saltonstall

Ray Dearth introduced **Dr. Richard Saltonstall,** Technical Director of the Udylite Corporation. The title of Dr. Saltonstall's talk was "What Lies Ahead for the Common Metals Plated from Aqueous Solutions?"

Copper: The largest use of copper for plating is in refining. This is done from an acid copper bath. Alkaline copper is used in the plating field because it has better throwing power, and because it can be plated directly on steel.

Use of P.R. plating is helpful. Roughness in cyanide plating is still a major problem. This may be due largely to irregular anode dissolution. In the future the largest application of copper may be in plating zinc base die castings.

Acid sulfate baths have been improved as far as leveling and brightness. However, it is still not applicable to deeply recessed parts. A cyanide copper flash is required on steel prior to the acid copper.

Nickel: The shortness of supply of nickel for the plating industry has been due to its use in stainless steels and other alloy steels for military use.

New developments in this field will be: (1) Higher current densities, (2) More leveling properties, (3) Better ductility, and (4) More heavy nickel for utensils, chemical equipment, sheet steel and wire.

Electroless nickel plating will be used as an adjunct to electroplating. Fluoborate and sulfamate nickel baths are employed in special applications. Dr. Saltonstall saw need for a good alkaline nickel comparable to an alkaline copper.

Chromium: In general this bath has resisted improvement in the past 30 years. Recent developments have been (1) Self regulating bath, (2) Crack-free chromium, (3) Development of stable surface active agent.

Zinc and Cadmium: Acid zinc bath is primarily used in strip steel and wire plating. Cadmium has been plagued by price fluctuation. Use of P.R. or current interruption may be employed for heavier deposits.

Precious Metals: Gold, indium, silver, platinum and rhodium. There is an increased trend toward heavier deposits for specialized engineering application.

Tin: Has excellent plating properties. Potassium formulation is definite improvement. There is a need for a good bright tin.

Lead: Lead on steel has good protective value as indicated by ASTM outdoor exposure tests. Throwing power of the acid baths is relatively poor, therefore there is again a need for an alkaline lead solution.

Alloy Deposits: This field represents one of the most fruitful for development. Ni-Co alloy plates are not as embrittled by chromium plating as bright nickel. The high price of cobalt prohibits use of these alloys at present.

White Brass has definite limitations. Tin-Nickel, and Tin-Zinc have desirable properties, particularly where soldering is

required. Ninety-five per cent Iron and 5 per cent Zinc alloy has been reported.

Following Dr. Saltonstall's talk a question and answer period followed.

H. J. WIESNER,
Secretary-Treasurer

ST. LOUIS

President Kelly on the AES

The first fall dinner meeting of the St. Louis branch was held at the York Hotel. Twenty-five members and guests were present for dinner. After dinner the business session was called to order by president **Hunleth** with 31 members present. **R. H. Heppel,** president of the Dallas branch, honored us with his presence. **Robert Coulson** was appointed research committee finance chairman. **William George** and **Arthur Wrisberg** were appointed to work with Robert on this committee.

Kelly

Our branch has attempted to organize an Electroplating School. Chairman of this committee is **Edward Sertl.** He reported the plans were not finalized. A discussion was held relative to the type of course, etc. **Edward Musick,** one of the charter members of the St. Louis branch, told of a school which was held about 35 years ago.

The following new members were elected: **Harry P. Materne, Earl W. Kunish.**

Richard Nyquist, our librarian, introduced the speaker of the evening, AES President **Clyde Kelly.** He showed slides of National AES Headquarters and personnel and related their duties. He told of his plans for the future of the Society, asking delegates and members to please offer suggestions. In a discussion which followed, it was pointed out, more time should be allotted for the business session at future conventions. Kelly offered suggestions which should help us organize our Electroplating School.

The meeting was adjourned with a vote of thanks to our president.

WARD W. KELLY,
Secretary-Treasurer

At the Southeastern Branch meeting on October 14, (l. to r.) Cy Shearer, Power Plating Co., LaGrange, Ga.; G. W. Cavanaugh, General Electric Co., Syracuse, N. Y.; Clyde Stovall, president Southeastern Branch, Scripto, Inc., Atlanta, Ga.; E. F. McFarland, Diamond Alkali, Atlanta, Ga. Cavanaugh talked on parliamentary procedure

FOR BETTER CORROSION RESISTANCE

Iolyte TANKS
Fabricated to your Specifications

NO MOLDS NEEDED — Made any size, any shape, at no extra cost and no loss of delivery time.
UNIFORM DIMENSIONS — NO TAPERING — Dimensions are same at bottom and top . . . means larger capacities than tapered molded tanks.
FLANGES, DAMS, Etc. — Can be inexpensively equipped with flanged connection, holes, overflow dams, baffles, separations, etc.
CHEMICALLY RESISTANT THROUGHOUT — Fabricated from **Iolyte** sheet properly reinforced. This is a structural material . . . not a lining.

Write for literature, prices, and table of chemical resistance for Iolyte tanks, crocks, ducts.

Iolyte CROCKS
Available from Stock

PRICE LIST

Gal. Cap.	Outs. Diam.	Outs. Hght.	List Cost	Gal. Cap.	Outs. Diam.	Outs. Hght.	List Cost
5	9"	18"	18.00	14	18"	12"	35.00
5	10"	15"	18.00	20	18"	18"	40.00
8	12"	16"	22.00	26	18"	24"	45.00
10	12"	20"	24.00	30	18"	28"	49.00
12	12"	24"	26.00	40	18"	36"	59.00
9	10"	24"	23.00	50	18"	48"	69.00
7	9"	24"	21.00	27	22"	18"	49.00
10	16"	12"	26.00	30	22"	20"	53.00
12	16"	14"	28.00	55	22"	36"	70.00
15	16"	18"	33.00	73	22"	48"	83.00
20	16"	24"	40.00	55	28"	22"	76.00
30	16"	36"	49.00	95	28"	36"	98.00
40	16"	48"	59.00	125	28"	48"	125.00

Iolyte DUCTS

ANY DIMENSIONS ANY CURVES ANY LENGTHS

Iolyte has greater resistance to chemical attack than stainless, Monel, or aluminum. 1/5 the weight of steel, it is superior in tension, flexural, and compression strength. Unlike thermoplastics **Iolyte** will not heat-distort below 350 deg.

Send drawings or prints for quotes and ask for literature giving chemical resistances.

Order from us or your distributor. Unless rated firm, payment with order. No COD's.
ALL PRICES F.O.B. FACTORY

SCHORI PROCESS DIVISION
FERRO-CO CORPORATION
VERNON BLVD. AT 43RD RD., LONG ISLAND CITY 1, N. Y.
FACTORY: 59-31 54TH STREET, MASPETH, L. I.

Fulton Asphalt Co.
BUILDERS BUILDING - 165 W. WACKER DRIVE
CHICAGO 1, ILLINOIS

Ferrolite® Hot Mastic Floors
- in colors
- acid proof
- oil and grease proof
- load sustaining
- over 500 lbs. psi.

Industrial Floors

Asphalt Mastic Floors

Acid Proof Mastic Floors

Serving Industry Since 1870

Write for literature

USE READER SERVICE CARD; INDICATE A 1284.

The KOCOUR SULFATE TEST SET with ELECTRIC CENTRIFUGE

. . . determines sulfate content in a chromium plating bath . . . directions are easy to follow . . . no calculations necessary . . . readings are directly in ounces per gallon.

● KOCOUR are specialists and pioneers in testing equipment for controlling plating — cleaning — pickling — anodizing — and hardening processes . . . special sets can be provided for your requirements.

Write today for further information—no cost or obligation.

KOCOUR COMPANY
4801 S. ST. LOUIS AVENUE
CHICAGO 32, ILLINOIS

Specify KOCOUR test sets from your supplier.

SOUTHEASTERN

Education on February 10-11

Our second regular meeting of the fall season was held on Friday evening, October 14, 1955, at the Belmont Steak House, Atlanta, Ga. The meeting was called to order at 8:15 P.M. with **Clyde Stovall** presiding and 26 members and guests present. The minutes of the September meeting were read and approved with the exception that so much as read, "three day educational session," was amended to read, "two-day educational session." A report of the first committee meeting relating to the educational session was read and approved. **Dick Russell**, general chairman of all the educational session committees, reported on the progress made toward the session. Russell advised that advertising contract order blanks and new stationery was already printed. **Stogner** was appointed in charge of the soliciting of advertisements. An entertainment committee was again postponed until a later date. A definite date for the educational session was set for February 10 and 11, 1956. It was reported that 500 tickets are being printed for the educational session. **Charles Lewis** introduced our speaker, **George W. Cavanaugh,** from General Electric in Syracuse, N. Y., who presented an enlightening talk on parliamentary procedure.

ROBERT H. PROBERT,
Assistant Secretary & Treasurer

SOUTHERN TIER

Lutz on Cleaning

The Southern Tier branch, AES, held a meeting at the Ah-Wa-Ga Hotel, Owego, N. Y. on October 18. The meeting was called to order by president **Rood** at 8:30 P.M.

Following the business meeting, **Stefanski** introduced the guest speaker, **Lutz** from Oakite Company. Lutz spoke on "Value of Protective Coatings and Cleaning of Various Metals." The fundamentals of cleaning, he said, is the removal of dirt. Dirt is matter out of place. Metal cleaning is the removal of objectionable film and the replacement of a more suitable film. Several factors which enter into cleaning are: surface to be cleaned; dirt or soil to be removed and quantity; degree of cleanliness; method of application such as soak, tank, washer, etc.; and safety of material, personnel and equipment. Lutz demonstrated the mixing of certain cleaner compositions and their ability to remove solid materials as well as oil and grease. Polyphosphate has replaced calcium phosphate. Synthetic material has replaced soap and has much better sudsing. However, soaps have better cleaning power over synthetics but are harmful to sensitive metals such as aluminum, brass, etc. A question and answer period followed.

D. Clarin of Oakite Company then showed some very interesting slides of his recent trip through Italy and Spain.

ROGER WHEELER,
Secretary

SPRINGFIELD

A Tour in Lieu of a Meeting

The Springfield branch did not hold a regular business meeting for the month of October. Instead, librarian **Edward Mahar** arranged a special tour of some of the facilities at Westover Air Force Base. Part of the itinerary included a visit to a maintenance section where all types of aircraft motors are rebuilt and tested. Then, a bus was available to take the group out on the line, where we all had an opportunity to examine a KC-97 Aerial Refueling Tanker Aircraft, and ask questions to our heart's content. After the tour, the group repaired to the Officers' Club, for refreshments and a social period, before enjoying a very fine prime ribs of beef dinner. The balance of the evening was spent in congenial and informational conversations.

There were 32 members and guests present.

HENRY L. HEISSFELD,
Secretary

TORONTO

"Corrosion in Action" Shown

The Toronto branch met at The Royal York Hotel, October 14, for their October dinner and technical session.

Thirty members were present for the dinner and forty members for the technical session.

Instead of a speaker, a 70-minute film in sound and color, entitled "Corrosion in Action" was shown. The film was supplied through the courtesy of the International Nickel Company.

At the closing of the meeting, members were reminded of the Annual Electroplaters' Dance to be held at the Club Kingsway, November 25.

WATERBURY

New V.P. Nominated; New Course Offered

The first regular meeting of the Waterbury branch for the year 1955–56 was held on Thursday, September 8 in the Colonial Room of the Hotel Elton. President **Petrocelli** opened the meeting at 7:00 P.M. **Dr. George Dubpernell** has submitted his resignation as 1st vice-president from the Waterbury branch due to job transfer. This was regrettable, but necessary. Then the president appointed a nominating committee consisting of **Frank Eddy, A. Griffith** and **H. Streeter** to select a new candidate for the post. They are to report at the October meeting. Two applications were read and approved: **Curtis Lovejoy** of Noera Mfg. Co. and **Michael Macri** of Rober Products. One transfer into the Waterbury branch was **Charles T. Smith,** formerly with the Newark branch. **Frank Bergin** was appointed chairman of the research committee for the year 1955–56. He succeeds **E. Candee** who held this important post. The business meeting was concluded at 8:00 P.M. At this time, the president turned the meeting over to technical chairman **E. Garland,** who in turn introduced **Louis P. Shannon** of E. I. duPont de Nemours, who gave an excellent talk on "Let's Look at Tomorrow." He documented the story of American progress by exhibiting developments resulting from scientific research and explained how this strengthened the national economy. A question and answer period followed.

The October meeting of the Waterbury branch was held on Thursday, October 13, in the Colonial Room of the Hotel Elton. Second vice-president **Theodore Voyda** opened the meeting at 7:00 P.M. **H. Streeter,** acting for the nominating committee, offered the name of Theodore Voyda, the 2nd vice-president, to replace George Dubpernell who resigned. He also offered the name of **Spencer L. Henn** as 2nd vice-president to take the office which will be vacated by Theodore Voyda, and A. Griffith as secretary-treasurer replacing S. L. Henn. It was voted to accept the report of the nominating committee. Two applications for membership were read and approved: **L. N. Davies** and **Eugene R. Malband.** The Waterbury branch was sorrowed by the passing away of a past president, **Anthony Maz.** A minute of silence was observed in his memory. E. Garland reported that **E. Foley** will be at the November meeting to give details of the electroplating course offered by the New Haven College. Plans for the annual Christmas party were discussed and the president will appoint a committee for this function. The business meeting adjourned at 8:00 P.M. and 2nd vice-president Voyda turned the meeting over to technical chairman **N. Tapazio.** Following the movie of the evening, Tapazio introduced **Richard Barrett,** who spoke on "Nickel Plating from the Sulfamate Bath." He showed application of this bath for aircraft and similar parts where stress free deposits are extremely important. In addition, he showed advantages such as high current density operation at lower temperatures, simplicity of control, low sensitivity to impurities. A very lively discussion followed Barrett's talk.

FRANK TIRENDI,
Director of Publicity

K. E. R. COATINGS FOR ZINC AND CADMIUM

K.E.R. CHRO-MITE #4

- GIVES MIRROR BRIGHT FINISH
- PROTECTS AGAINST CORROSION
- STAIN RESISTANT
- OUTPERFORMS SIMILAR COATINGS

OLIVE GREEN G. C. & G. Z.

- MAXIMUM CORROSION PROTECTION
- EXCELLENT PAINT BASE
- WILL PASS SEVEREST SPECIFICATIONS

ZINLUX (ZINC BRIGHTENER)

- FOR LUSTROUS BARREL AND STILL FINISH
- EXCELLENT THROWING POWER

CADLUX (CADMIUM BRIGHTENER)

- BRIGHTENS BARREL OR STILL
- INCREASES PLATING RANGE
- ELIMINATES BURNING

KOSMOS

Electro-Finishing Research, Inc.

13 Valley St. Belleville 9, N. J.

Phone: PLymouth 1-0049

USE READER SERVICE CARD; INDICATE A 1287.

NICKEL ANODES

Cast from your scrap at nominal charge or from stock. All lengths to 90 inches.

Prompt Delivery

SABIN METAL CORPORATION

310 Meserole St.
Brooklyn 6, N. Y.
EVergreen 1-5000

USE READER SERVICE CARD; INDICATE A 1288.

WESTERN ONTARIO

Herberth Head Visits

A regular monthly meeting was held October 21 at the William Pitt Hotel in Chatham. As usual the hotel provided an excellent dinner although our small numbers looked out of place in the big banquet hall. The Western Ontario branch was honored to have our 3rd Vice-President, **Herberth Head** from Detroit, with us. He spoke briefly and expressed his confidence in the continuing success of the Western Ontario branch. **Howard McAleer** of Formax Corp., Detroit, gave a well rounded paper discussing buffing compounds—both liquid and bar and especially referred to the advances made in these over recent years. Included were some remarks with regard to sisal buffing. In business, the big item was the holding over until after Christmas of the annual ladies night by the Western Ontario branch.

ALEX. V. CORBIT,
Vice-President

WICHITA

Dr. Bancroft's Axioms Reviewed

The October meeting of the Wichita branch of AES was well attended with approximately 30 members present.

Two guests, **Norris H. Madden** and **H. O. Meserve, Jr.**, made application for admission to the AES.

The program for the evening was announced by **Hank Grimme,** librarian. **Henry DeWitt** of Chromium Inc., Kansas City, Mo., gave a well prepared and informative talk on "Principles of Electroplating." DeWitt brought to mind Voltaire, Ohm, Galvani, and Henry Ford, who applied principles of electricity to produce wonders. Believing strongly in the axioms of electricity by **Dr. Bancroft**, he referred to them throughout the discussion. The axioms are:

(1) Bad deposits are due to excessive admixture of some substance or to excessively large crystals.

(2) Excessive admixture of any compound can be eliminated by changing the conditions so that the compound cannot precipitate or plate out.

(3) Increasing the current density or lowering the temperature decreases the size of the crystal.

(4) The crystal size is decreased when there are present at the cathode services substances which are absorbed by the deposited metal.

(5) If the given solution will give a good deposit at any current density, it will give a good deposit at any higher current density, provided the conditions at the cathode service are kept constant.

(6) Treeing is facilitated by a high potential drop through the solutions and by conditions favorable to the formation of large crystals.

(7) Decreasing the metal ion concentration decreases the size of the crystals.

This was one of the most informative talks we have had in quite some time, and all members were well pleased. It is regrettable that all members could not be present.

Our president, **Ogie French,** spoke for all members in thanking DeWitt for a talk well presented.

F. B. SWIFT,
Secretary

THE ANSWER TO YOUR TANK HEATING PROBLEMS

FOR ACID HEATING JOBS

G SERIES
FUSED QUARTZ
IMMERSION HEATERS

Over 40,000 CLEPCO Fused Quartz Heaters now in service.

Dependable, controlled heat at low operating cost.

Wide range of Standard Sizes for every need.

Only Fused Quartz Heater recommended and sold by all leading plating supply houses.

FOR ALKALINE HEATING JOBS

W & WS SERIES
STEEL AND STAINLESS
IMMERSION HEATERS

Specify CLEPCO Non-Magnetic Stainless Steel Heaters for your alkaline electro cleaners and bright copper plating tanks.

Specify CLEPCO Steel Heaters for all other alkaline tanks.

All leading Plating Supply Houses can furnish from stock.

SEE YOUR PLATING SUPPLY HOUSE

Clepco

WRITE US FOR LITERATURE

CLEVELAND PROCESS COMPANY
1965 EAST 57th STREET
CLEVELAND 3, OHIO

WASHINGTON D.C. IN 1956

WASHINGTON D.C. IN 1956

MEMO

for better immersion heaters-

Designed for your acid pickling and electroplating solutions or other acid baths.

This compact electric immersion heater unit is made of VITREOSIL® (pure fused silica) with corrosion-resistant cap. Designed for increased heat transfer per unit area; offers greater resistance to chemical attack. Ground wire inside VITREOSIL sheath for additional protection. Minimum safe immersion depth marked on sheath.

VITREOSIL heaters can be custom designed for special applications. Write today for Technical Bulletin 19 and prices.

THERMAL AMERICAN FUSED QUARTZ CO., INC.

18-20 Salem Street Dover, New Jersey

Company _____

Name and Title _____

Street _____

City _____ Zone ____ State _____

FOR FURTHER INFORMATION, USE READER SERVICE CARD; INDICATE B 1200.

avoid costly rejects due to unacceptable coating thickness...

For quality control and acceptance tests, measure thickness of coatings on metals the easy, accurate, non-destructive way, with the . . .

AMINCO BRENNER MAGNE-GAGE

Widely used by industry and government for accurately measuring the thickness of:

1. Non-magnetic coatings (metallic or non-metallic) on magnetic base metals.
2. Nickel coatings on magnetic or non-magnetic base metals.

Measures coatings on plane, convex or concave surfaces. Gives speedy and accurate results. Easy to use by non-technical personnel.

Avoids expensive rejections due to coatings that may be too thin, or non-uniform. Eliminates the expense involved in re-plating or discarding specimens spoiled by destructive tests . . . every piece tested is unharmed and ready for use or shipment. Saves materials wasted by coatings thicker than necessary. Its use leads to the discovery of faults that may exist in plating methods or equipment.

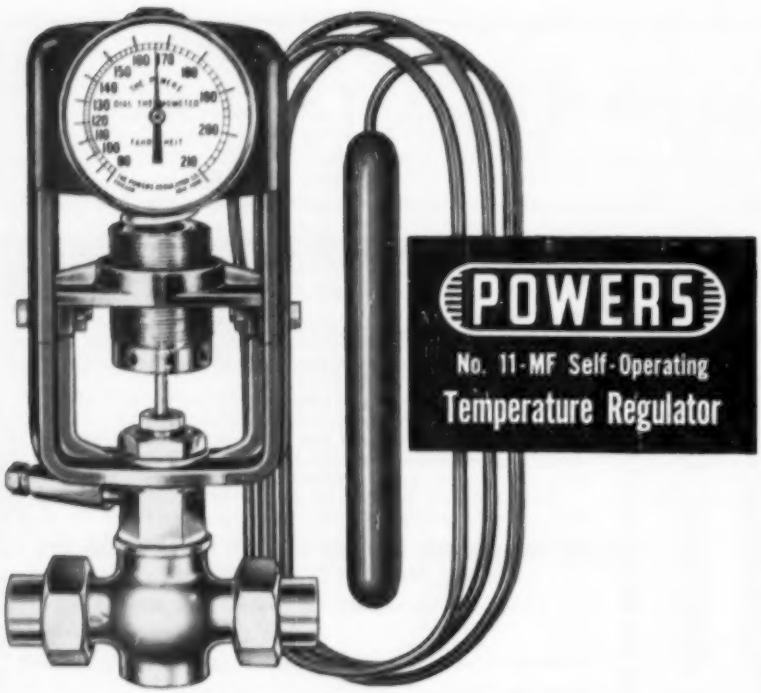
Write for Bulletin 2253- F

Coating on cylindrical object being measured with Magne-Gage

AMINCO *Laboratory Instruments*

AMERICAN INSTRUMENT COMPANY, INC.

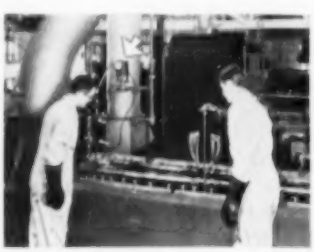
Silver Spring, Maryland • In Metropolitan Washington, D. C.



Simplest Way to Control Temperatures Accurately in Plating, Cleaning and Rinse Tanks

Lowers Costs — Betters Quality Control — Repays Its Cost 3 to 6 Times a Year. You eliminate "the human element" in temperature control with Powers Automatic Regulators. Simple, compact and dependable, they stop OVER-heating. Thus, *automatically*, you save on burnt plated parts, rejected anodizing, decomposition of costly additives, and loss of volatile ingredients from some cleaning solutions. You save, too, by preventing "boil-overs." No waste of steam and water by evaporation.

Why Powers No. 11-MF Regulator Gives Better Control and Lasts Longer. Better TEMPERATURE control results from powerful bellows and minimum valve stem friction. Valve Stem Lubricator aids easy movement of valve stem without binding. Double ply metal used in Powers bellows outlasts single ply type. Greater durability of plastic covered bulb and tubing also helps prolong the life of the regulator.



Easy to Install — No Insulators Required. Installation of the Powers No. 11-MF goes quickly with no troublesome insulation problems. The unit is completely self-insulated.

Large Dial Thermometer Gives Visual Check. Instant visual temperature check of solutions under control is obtained from the large dial thermometer, makes it easy to adjust regulator for different temperatures.

Powers Nationwide Service and 24 Hour Delivery in the U.S.A. are important time and money saving advantages. Order a Powers No. 11-MF Regulator now. Call your supply firm or write us direct for Bulletin 330 and prices.

(c50)

THE POWERS REGULATOR COMPANY

SKOKIE, ILLINOIS | *Offices in chief cities in U.S.A., Canada and Mexico*

Over 60 years of Automatic Temperature and Humidity Control

MEMBERSHIP REPORT

ELECTIONS

Adelaide: P. F. Wagenfeller
Capitol District: D. Kollath
Cleveland: S. Baratko, T. A. Hirt
Columbus: H. D. Jones, R. C. Watson
Dayton: R. E. Greb
Detroit: P. Field, D. S. Hall, C. U. Wilkie
Louisville: J. P. Doherty
Milwaukee: B. Coughlin, W. Duckworth, B. Kotz, K. Meyer, E. Schultz, F. Walker, R. Yackley
Mississippi Valley: D. G. Carroll, P. G. Chamberlain, J. Doss, H. H. Erps, B. G. Faust, G. Fuller, Jr., F. D. Gour, A. F. Hansen, J. L. Hartman, D. E. Hintz, H. G. Irwin, D. R. Johnson, J. Knanishu, V. J. Kron, E. J. Maushard, J. McConaughey, E. M. McCullough, W. F. McKay, J. H. Miller, S. B. Nielsen, B. J. Nordblom, G. F. Rial, J. D. Rowe, D. H. Sale, E. Schmittgrund, R. J. Shelton, E. C. Tinsley, H. J. Veith, R. Wolff
Newark: E. E. Carlson, A. J. Cartwright, W. W. Brodin, C. A. Holden, Jr., L. J. Jarecki, B. Sonnenfeldt
Pittsburgh: E. Johnson, S. E. Johnson
Rochester: J. J. Cipolla
Rockford: F. Prybylinski
Saginaw Valley: F. G. Belill, W. P. Devan, C. E. Kimmel, J. H. Lindsay, C. P. Nankervis, E. Spalding
St. Joseph Valley: R. H. Anderson
St. Louis: E. W. Kunish
San Antonio: K. D. Christians, R. L. McGowen
Toronto: S. G. Reesor
Member-at-Large: J. Chadwick, Birmingham, England; W. W. Diekmann, Waterloo, Iowa; H. E. Freiheit, Phoenix, Arizona; D. H. Lloyd, Birmingham, England; F. Soderstrom, Kungsoer, Sweden; J. W. White, West Monroe, Louisiana

REINSTATEMENTS

Bridgeport: R. J. Peck
Central Michigan: R. E. Tobin
Philadelphia: L. W. Abraham, D. Cutler, H. S. Isett
Pittsburgh: G. Herring, W. Oboryshko, P. W Rhodes, M. G. Vucich
Rochester: H. Beale
St. Louis: E. Faltyn, E. P. Savage

TRANSFERS

Bridgeport: R. Plaisted to Lancaster
Buffalo: R. Hofmann to Rochester
Capitol District: W. B. Wolff from New York
Chicago: R. B. Eyre to Mississippi Valley, L. O. Gilbert to Mississippi Valley, K. Wolff to Mississippi Valley
Cleveland: A. Nortof from Newark, A. H. Pope from Philadelphia
Hamilton: J. Harden to Toronto
Newark: A. Nortof to Cleveland
Philadelphia: A. H. Pope to Cleveland
Rochester: R. Hofmann from Buffalo
St. Joseph Valley: D. Kraft to Chicago
Toronto: K. E. McColm to Montreal
Member-at-Large: A. H. Beebe, Sr., to Detroit

RESIGNATIONS

Chicago: P. Belson
Cleveland: R. W. Grace, J. C. Tervay
Rochester: C. Hendershott, L. Wells
Saginaw Valley: W. C. Clark, G. C. Kinde

SUSPENSIONS

Buffalo: K. C. Merrill
Capitol District: C. A. Jewel, H. Lazaar, D. S. McMullen, G. L. Matson
Central Michigan: R. T. Minshull
Chicago: E. W. Smith, Jr.
Hartford: C. W. Bennet
Rochester: S. Bommatei, F. Dougherty, G. Stenzel, J. Zimmerman
San Antonio: A. D'Amico, G. A. Krone, Jr., E. Mundoz, W. Nagle, Jr., H. T. Ruiz
Waterbury: A. Berthiaume
Member-at-Large: H. J. Bache, Surrey, England

DEATHS

Providence-Attleboro: J. P. Almeida
Waterbury: A. J. Maz

FOR FURTHER INFORMATION, USE READER SERVICE CARD; INDICATE B 1203.

For complete information write or call

ADVERTISING DEPARTMENT
445 Broad Street
Newark 2, New Jersey
HUmboldt 2-3400

DIRECTORY OF OFFICERS AND RESEARCH CHAIRMAN

AES OFFICERS

President.....CLYDE KELLY
American Plating Company
808 Keo Way, Des Moines, Iowa

First Vice-President.....DR. SAMUEL HEIMAN
Philadelphia Rust Proof Company
3227 Frankford Avenue, Philadelphia 34, Pa.

Second Vice-President.....FRANCIS T. EDDY
Technicraft Laboratories, Inc.
Thomaston-Waterbury Road, Thomaston, Conn.

Third Vice-President.....HERBERTH E. HEAD
Automotive Body Division
Chrysler Corporation
Detroit 31, Mich.

Past President.....DR RALPH A. SCHAEFER
Clevite Brush Development Company
Division of Clevite Corporation
540 E. 105th Street, Cleveland 8, Ohio

Executive Secretary.....P. PETER KOVATIS
445 Broad Street, Newark 2, N. J.

AES RESEARCH COMMITTEE

Chairman.....LESLIE C. BORCHERT
Houdaille-Hershey Corp., Detroit, Mich.

Secretary.....P. PETER KOVATIS
445 Broad Street, Newark 2, N. J.

AES BRANCH DIRECTORY

ADELAIDE meets second Wednesday of each month at 7:30 P.M. at the University of Adelaide, North Terrace, Adelaide. Secretary-treasurer, R. J. Down, Room 30, 17 Currie Street, Adelaide, S. A., Australia.

ALLENTOWN-READING meets third Wednesday of each month at 7:00 P.M. in Scotty's Anchorage, Second and Main Streets, Emmaus, Pa. Secretary-treasurer, Edgar H. Iobst, Jr., 163 Main Street, Emmaus, Pa. Research finance committee chairman, Lee C. Wotring, 526 N. St. Elmo Street, Allentown, Pa.

BALTIMORE-WASHINGTON meets second Tuesday of each month with meetings in Baltimore at the Engineers' Club and in Washington, D. C., at the National Bureau of Standards. Secretary, Carl H. Thiede, 8426 Piney Branch Road, Silver Springs, Md.

BOSTON meets first Thursday of each month in Hotel Statler. Secretary, Dr. George P. Swift, 53 Galen Street, Watertown 72, Mass. Research finance committee chairman, Louis V. Gagnon, 53 High Street, Natick, Mass.

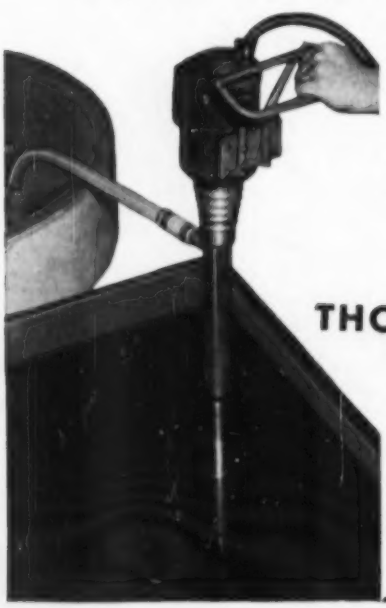
BRIDGEPORT meets second Friday of each month in Barnum Hotel. Secretary-treasurer, Robert G. Parker, 25 Beverly Road, Bridgeport 58, Conn.

BUFFALO meets first Friday of each month in Markeen Hotel. Secretary, E. G. Sampson, Jr., 43 W. Main Street, Falconer, N. Y. Treasurer, R. E. Campbell, 238 Sprague Street, Jamestown, N. Y. Research finance committee chairman to be appointed.

CAPITOL DISTRICT meets first Monday of each month at Panetta's Restaurant, Menands, N. Y., at 7 P.M. for dinner;

THOMPSON'S CENTRI-F ACID PUMP

Thompson's new Centri-F Acid Pump will safely transfer acids from small, open, storage and plating tanks as well as from standard carboys and drums. It is a self-priming, portable pump, driven by a specially designed, totally enclosed motor, and delivers a smooth, spurt-free flow of acid at the rate of approximately six gallons per minute. No acid remains in the pump when it is removed from the container. The pump is individually constructed of materials suitable to the actual acid to be handled.



THOMPSON
MANUFACTURING COMPANY, INC.
ERIE, PA.

Order from your regular supply jobber

Tamms

NEW!

Soft amorphous type
MICRO-SILICA
with these special features

OIL ABSORPTION (G & C)	36.4 to 40.3 LBS.
PH VALUE	5.0 to 5.2
MOISTURE	.5%

A NEW PROCESS SILICA

PARTICLE SIZE RANGE 1 TO 15 MICRONS
99% MINUS 10 MICRONS

New improved equipment assures highest quality and production control

WRITE TODAY FOR SAMPLES, PRICES AND SPECIFICATIONS

TAMMS INDUSTRIES, INC.,
228 N. La Salle St., Chicago 1, Ill.

AES BRANCH DIRECTORY

educational session at 8 P.M. Secretary, Charles Schenk, 1765 Lenox Road, Schenectady, N. Y. Treasurer, John Green, R. D. 1, Thatcher Park Road, Voorheesville, N. Y. Research finance committee chairman, Chester J. Klimek, 16 Southern Avenue, Pittsfield, Mass.

CENTRAL MICHIGAN meets second Tuesday of each month at 7:00 P.M., alternating between Meadow Lark Inn in Jackson and Porter Hotel in Lansing. Secretary-treasurer, E. J. Bosen, 411 Third Street, Jackson, Mich. Research finance committee chairman, Dr. F. Gurnham, Dept. of Chemical Engineering, Michigan State College, E. Lansing, Mich.

CHICAGO meets second Friday of each month at 8 P.M. at Western Society of Engineers, 84 E. Randolph Street. Secretary-treasurer, Paul Glab, 882 N. Paulina Street, Chicago 22, Ill. Research finance committee chairman, Charles Geldzahler, c/o Platers' Technical Service, Inc., 509 S. Wabash Avenue, Chicago 9, Ill.

CINCINNATI meets fourth Wednesday of each month at 6:30 P.M. in Engineering Society Headquarters, East McMillan Street and Woodburn Avenue. Secretary, R. K. Evans, 8484 Wicklow, Cincinnati 36, Ohio. Treasurer, G. T. Speers, 1203 Fifth Avenue, Dayton, Ky. Research finance committee chairman, W. Wilson Loveless, 1350 Arlington Street, Cincinnati 25, Ohio.

CLEVELAND meets first Friday of each month in Hotel Carter at 8 P.M. Secretary-treasurer, R. I. Peters, 12901 Elmwood Avenue, Cleveland, Ohio.

COLUMBUS meets first Friday of each month at 8 P.M. in Battelle Memorial Institute Auditorium. Secretary, Michael Farr, 1735 Franklin Avenue, Columbus 5, Ohio. Research finance committee chairman, to be appointed.

DALLAS-FORT WORTH meets third Wednesday of each month at 6:30 P.M. in Lennox Hotel, Grand Prairie, Texas, half-way between Fort Worth and Dallas. Secretary-treasurer, research finance committee chairman, A. C. Fricke, 212 Julien Street, Dallas 3, Texas.

DAYTON meets third Wednesday of each month in the Biltmore. Secretary, Richard M. Clinchens, 33 W. Market Street, Germantown, Ohio. Research finance committee chairman to be appointed.

DETROIT meets first Friday of each month in Hotel Statler at 8 P.M. Secretary-treasurer, Edward J. Kubis, Wyandotte Chemicals Corp., Wyandotte, Mich. Research finance committee chairman, R. J. Racine, Wyandotte Chemicals Corp., Wyandotte, Mich.

GRAND RAPIDS meets second Friday of each month at Fingers Restaurant at 7 P.M. for dinner, educational session at 8:15 P.M. Secretary, Don Smith, 1825 Martin, Grand Rapids, Mich. Treasurer, P. Norton, 1119 Orchard. S. E., Grand Rapids, Mich. Research finance committee chairman, R. O. Watson, 3045 Kalamazoo, S. E., Grand Rapids, Mich.

HAMILTON meets third Friday of each month, 8 P.M. at Fishers Hotel, Hamilton, Ontario, Canada. Secretary, N. A. Graham, Stoney Creek, P. O. Hamilton, Ont., Canada. Research chairman, W. G. Finlay, 7 Hill Street, Hamilton, Ont., Canada.

HARTFORD meets third Monday of each month in Hotel Bond, Hartford, Conn., at 7:45 P.M. Secretary, Stanley Platoz, 26 Erwin Place, New Britain, Conn. Treasurer, B. Cohen, 185

WE ADMIT
OUR FINISH WILL NOT
BLIND YOU
BUT WE ARE SURE
TRUE BRITE
(BARREL)
NICKEL
BRIGHTENER
CAN HELP YOU

- BRIGHTER—Equal to best still tank quality
- BETTER DUCTILITY—No cracking or peeling
- SIMPLE TO USE—Temperature not critical and no carbon treatments necessary
- LOWER COSTS—8 oz./100 gals. to start and 2 to 5 oz. addition/500 amp. hours
- NO RETURNABLE CONTAINERS—In 1 gal. jugs

WRITE FOR TECHNICAL BULLETIN ON BARREL NICKEL PLATING

TRUE BRITE CHEMICAL PRODUCTS CO.
BOX 31C OAKVILLE, CONN.

USE READER SERVICE CARD; INDICATE A 1293.

For ALL Your Metal Finishing Needs Depend on DAVIES

The Southwest's Leading Supplier of Industrial Plating and Polishing

- COATINGS
- CHEMICALS
- PLATING RACKS
- ABRASIVES
- EQUIPMENT
- ENGINEERING

Davies
Supply & Manufacturing Co.
4160 Meramec St. • MOhawk 4-9332 • ST. LOUIS 16

301 N. Market St. • PRospect 5423 • Dallas 1

813 W. 17th St. • BAltimore 2128 • Kansas City 8

USE READER SERVICE CARD; INDICATE A 1294.

AES BRANCH DIRECTORY

High Street, Willimantic, Conn. Research finance committee chairman, Frank Smith, Derby Milford Road, R. F. D. 1, Orange, Conn.

HOUSTON meets third Tuesday of each month at 7 P.M. in the Ben Milam Hotel, Houston, Texas. Secretary-treasurer, H. C. Van Wagner, c/o Barada & Page, 2812 Center Street, Houston, Texas. Research finance committee chairman, O. L. Smith, 2903 W. Dallas, Houston, Texas.

INDIANAPOLIS meets first Wednesday of each month at 8 P.M., at Fox Steak House, 1207 E. Washington Street. Secretary, Miss Edna Rohrabaugh, 415 N. 23rd Street, Lafayette, Ind.

JACKSON-LANSING: Name has been changed. See Central Michigan.

KANSAS CITY meets third Thursday of each month at the Berkshire Hotel, Troost and Linwood Blvd., Kansas City, Mo. Secretary, Olin K. Bock, Turco Products, Inc., 2112 Grand Ave., Kansas City, Mo.

LANCASTER meets second Friday of each month at 8 P.M. September, December and April meetings are held at Hanover, York and Harrisburg, respectively; all other meetings at the Old Mill Inn, Lancaster, Pa. Secretary-treasurer, Harry A. Saylor, 40 N. Poplar Street, Elizabethtown, Pa. Research finance committee chairman, Harry Hovis, Lincoln Highway, W. Lancaster, Pa.

LOS ANGELES meets second Wednesday of each month at 7 P.M. in Rodger Young Auditorium. Secretary, G. Hetz, 152 Clagstand Drive, Puente, Calif. Research finance committee chairman, Tony Stabile, 417 E. 16th Street, Los Angeles 21, Calif.

LOUSIVILLE meets third Thursday of each month at 6:30 P.M., in Kapfhammers Party House, 1506 S. Shelby Street, Louisville, Ky. Secretary-treasurer, Joseph G. Sterling, 6025 Peggy Drive, Louisville 13, Ky. Research finance committee chairman, R. G. Marshall, 3020 Talisman Road, Louisville 5, Ky.

MELBOURNE meets third Thursday of each month at 8 P.M. in Metallurgy Theatre, Melbourne Technical College, 124 Latrobe Street. Honorary secretary-treasurer, B. Reaburn, Park Road, Ringwood, Victoria, Australia.

MILWAUKEE meets first Friday of each month at 8 P.M. in the East Room, Hotel Ambassador. Secretary-treasurer, Clifford A. Peters, 4124 W. Southland Drive, Milwaukee, Wisc. Research finance committee chairman, Les Diveley, 2936 N. 84th Street, Milwaukee 11, Wisc.

MISSISSIPPI VALLEY meeting date to be announced. Secretary-treasurer, P. G. Chamberlain, 2131 Harrison St., Davenport, Iowa.

MONTREAL meets first Tuesday of each month at 8:30 P.M. in Mount Royal Hotel. Secretary, Jean Monette, 11700 Notre Dame Street, E., Montreal, Canada. Research finance committee chairman, P. M. Coady, 216 Westminster Avenue, Montreal West, Montreal, Canada.

NEWARK meets third Friday of each month at 8 P.M. in Hotel Robert Treat. Secretary, Dr. D. G. Foulke, Hanson-Van Winkle-Munning Co., Matawan, N. J. Treasurer, George Wagner, Hy-Grade Electro Plating Co., 35 Fourth Street, Newark, N. J. Research finance committee chairman, John Gumm, 538 Forest St., Kearny, N. J.

ZINC PLATERS:

FOR QUALITY PERFORMANCE AT LOWEST COST, purify cyanide zinc plating solutions with

McKeon's

Zinc-Brite

Regular use keeps zinc solutions constantly clear. Eliminates need for ANY OTHER purifying treatment. Brightens work.

Write-Phone-Wire Collect

Sulphur Products Co. Inc.

228 McKeon Way

Greensburg, Pa.

Filter your solutions!

*Req. App. for

50-2400 GAL/HR

Model LSI-10 . . .

Cap. 100 gal/hr H.T. Lucite Filter Assembly. Stainless pump . . . totally enclosed Motor . . . portable . . . Wt. 40 lbs . . . 12" x 16" x 16" high.

. . . Distributors in principal cities. . . . *Write for literature.*

PARTIAL LIST OF MODELS

Model	Rated Capacity	Overall Size	Weight
LSI-5	50 gal/hr	11"x14"x12"	30 lbs.
LSI-10	100 gal/hr	12"x16"x16"	40 lbs.
ASI-300	300 gal/hr	2'x2'x2'	125 lbs.
ASI-600	600 gal/hr	2'x2'x2'	150 lbs.
RLS-1200	1800 gal/hr	2'x3'x3'	300 lbs.

SERVICE . . . Filters practically any acid or alkaline solution from pH 0 to pH 14; removes particles down to one micron in size. Strainer stops metallic objects.

DESIGN . . . Filter Assembly fabricated of stainless steel 316, high temperature lucite, rubber-lined, Haveg or Sethrin* resin. **Filter Tubes** of cotton, dynel, porous stone or porous carbon. **Pumps** fabricated of Hastelloy, stainless 316 or plastic; centrifugal or self-priming. **Motors** drip-proof, totally enclosed, or explosion proof, 110 or 220 volt, single or three-phase, 50 or 60 cycle, sleeve or ball bearing. **Hose** — special acid and alkali resistant. **Base** — Linen Phenolic laminate on rubber tire ball bearing casters.

Sethco MANUFACTURING COMPANY

72 Willoughby Street • Brooklyn 1, New York

AES BRANCH DIRECTORY

NEW HAVEN meets second Tuesday of each month at Mason Laboratory, Yale University. Secretary-treasurer, B. J. Gaffney, 40 Filbert Street, Hamden 14, Conn. Research finance committee chairman, W. K. Murray, 48 Maple Avenue, Meriden, Conn.

NEW YORK meets second and fourth Fridays of each month at 8:30 P.M. in the Statler Hotel. Secretary-treasurer and research finance committee chairman, Milton Nadel, 4115 50th Ave., L. I., N. Y.

PHILADELPHIA meets fourth Friday of each month at the Engineers' Club, 1317 Spruce Street, Philadelphia, Pa., at 8 P.M. Secretary, I. Wm. Marcovitch, 1302 St. Vincent St., Philadelphia, Pa. Treasurer, Paul Mentzer, Sr., 7242 Bingham Street, Philadelphia 11, Pa. Research finance committee chairman, Herman P. Wright, 194 Atlantic Avenue, Trenton, N. J.

PITTSBURGH meets first Wednesday of each month at 8 P.M. in the Avalon Room of the Sheraton Hotel. Secretary, Irvin H. Schram, Jr., 4782 Delma Drive, Pittsburgh 27, Pa. Treasurer. W. F. Pizoli, 6833 Meade Street, Pittsburgh 8, Pa. Research finance committee chairman, Myron Ceresa, 207 Highland Road, Pittsburgh 35, Pa.

PORTLAND meets second Tuesday at 6:30 P.M. in Berg's Chalet. Secretary-treasurer and research finance committee chairman, K. B. Humphrey, 2750 N. W. 31st Avenue, Portland 10, Oregon.

PROVIDENCE-ATTLEBORO meets third Monday of each month at 8 P.M. in Providence Engineering Society Hall, 195 Angell St., Providence, R. I. Secretary, F. L. Sherman, 17 Hillsdale Drive, Cranston, R. I. Research finance committee chairman, P. B. Lonsbury, 78 North Ave., Attleboro, Mass.

ROCHESTER meets third Monday of each month at 8 P.M. at the 40 & 8 Club, 933 University Avenue. Secretary, Frederick Johnson, 21 Shire Oaks Drive, Pittsford, N. Y. Research finance committee chairman, Clarence Van Epps, 305 Hurstburne Road, Rochester 9, N. Y.

ROCKFORD meets second Monday of each month at 7 P.M. in the Faust Hotel. Secretary-treasurer, E. J. Budden, 122 Twelfth Street, Rockford, Ill. Research finance committee chairman, David Stockton, 1511 Warren Road, Rockford, Ill.

SAGINAW VALLEY meets at Zehnder, Frankenmuth, Mich., second Wednesday of each month, September through May, except February, at 7 P.M. Secretary-treasurer, Raymond E. Gittins, 215 N. Birney, Bay City, Mich.

ST. JOSEPH VALLEY meets first Wednesday of each month at 8 P.M. in Hotel Elkhart, Elkhart, Ind. Secretary-treasurer, Harold J. Wiesner, 1016 Osolo Road, Elkhart, Ind. Research finance committee chairman, Arthur G. Wiegand, 181 North Elkhart Avenue, Elkhart, Ind.

ST. LOUIS meets second Wednesday of each month at 6:30 P.M. at the York Hotel, 6th and Market, St. Louis, Mo. Secretary-treasurer, Ward W. Kelly, 7046 Deerpath Drive, St. Louis, Mo. Research committee finance chairman to be appointed.

SAN ANTONIO meets third Monday of each month at De-Winne's Belgium Inn, 3119 W. Commerce, San Antonio, Texas at 7 P.M. Secretary-treasurer, T. H. Collard, 442 Pilgrim Drive, San Antonio, Texas.

SAN FRANCISCO meets second Thursday of each month alternating between St. Julien Restaurant, 140 Battery Street, San Francisco, and El Curtola Restaurant, 510 17th Street, Oakland. Secretary, B. I. Trygstad, 1727 Oak Street, Redwood City, Calif. Treasurer, R. L. Hefner, 286 Martens Avenue, Mt. View, Calif.

SEATTLE-PUGET SOUND meets the third Tuesday of each month at 8 P.M. at the Stewart Hotel, Second and Stewart, Seattle, Wash. Secretary, Mrs. Helen Archibald, 17560 Tenth Avenue, N. W., Seattle, Wash. Treasurer, R. Becker, 558 First Avenue, So., Seattle, Wash.

SOUTHEASTERN meets second Friday of each month at 7:30 P.M. at the Belmont Steak House, Atlanta, Ga. Secretary-treasurer, W. T. Weymouth, P. O. Box 246, Weaverville, N. C. Research finance committee chairman, C. H. Hohner, Udylite Corp., 1841 Cheshire-Bridge Road, N. E., Atlanta, Ga.

SOUTHERN TIER meets third Tuesday at 7:30 P.M. at the Ah-Wa-Ga Hotel, Owego, N Y. Secretary, R. W. Wheeler, Austin F. Fletcher, Inc., Box 536, Binghamton, N. Y. Treasurer, M. Ihrie, 14 Pine View Terrace, Sydney, N. Y. Research finance committee chairman, E. Szymaniak, 118 Downs Ave., Johnson City, N. Y.

SPRINGFIELD meets fourth Monday of each month at 6:30 P.M. in Blakes Restaurant, 15 Market Street, Springfield, Mass. Secretary, Henry L. Heissfeld, 74 Chilson Street, Springfield, Mass. Treasurer, G. H. Mangeau, Hampton Ponds, Westfield, Mass. Research finance committee chairman, John E. Costigan, 74 Clairmont Place, Longmeadow, Mass.

SYDNEY meets second Thursday of each month at 7:30 P.M. at 155 King Street, Sydney. Secretary-treasurer, J. Lean, 63 Carranya Rd., Lane Cove, Sydney, Australia.

SYRACUSE meets third Monday of each month at 8 P.M. in Richard's Restaurant, 106 Ashdale Avenue, Syracuse, N. Y. Secretary, A. G. Martineau, Jr., 1024 Onondaga Avenue, Syracuse, N. Y. Treasurer, Allen A. Gutekunst, 224 Rich Street, Syracuse, N. Y. Research finance committee chairman, K. S. Parnell, 126 Wood Avenue, Syracuse, N. Y.

TOLEDO meets first Thursday of each month at Park Lane Hotel. Dinner at 6:30 P.M.; meeting at 8 P.M. Secretary-treasurer, Gaston Bergeman, 703 Pine Street, Fremont, Ohio.

TORONTO meets second Friday of each month in Royal York Hotel. Dinner, 6:30 P.M.; meeting, 8:30 P.M. Secretary-treasurer, E. F. Hutt, 19 Aneta Circle, Willowdale, Ontario, Canada.

TWIN CITY meets first Monday of each month. October through June, in the Covered Wagon (Lodge Room), 114 S. 4th Street, Minneapolis, Minn., at 7 P.M. Secretary-treasurer, Robert L. Buckley, c/o Industrial Chemical and Equipment Co., 205 11th Avenue, So., Minneapolis 15, Minn. Research finance committee chairman, E. H. Lindemann, 1213 N. Leighton, Minneapolis 22, Minn.

WATERBURY meets second Thursday in September through May. Dinner 6 P.M.; business meeting 7 P.M. Technical meeting 8 P.M. Secretary-treasurer, Spencer L. Henn, 99 Ridgeview Place, Cheshire, Conn. Research finance committee chairman, Ellsworth T. Candee, Beach Avenue, Watertown, Conn.

WESTERN ONTARIO meets third Friday of each month at the Bungalo Inn, Lambeth, Ontario at 9 P.M. Secretary-treasurer, Dave Mainland, 21 Maple Street, Chatham, Ontario. Research finance committee chairman, Paul B. Croly, c/o Ontario Steel Products, Ltd., Chatham, Ontario.

WICHITA meeting place indefinite. Secretary, Frank Swift, 2041 North Mosley, Wichita 4, Kan. Treasurer, Leon Lawless, 1211 E. Douglas, Wichita, Kan.

INDEX TO ADVERTISERS

ACME MFG. COMPANY 1559
Ferndale, Michigan
ALLIED INDUSTRIES CO. 1570
Detroit, Mich.
ALLIED RESEARCH PRODUCTS, INC. 1473
Baltimore, Md.
ALSOP ENGINEERING CORP. 1506
Milldale, Conn.
AMERICAN BUFF COMPANY 1481
Chicago, Ill.
AMERICAN INSTRUMENT CO. 1581
Silver Spring, Md.
AMERICAN PLATINUM WORKS 1569
Newark, New Jersey
A & P FINISHING & MFG. CO. 1499
Melvindale, Michigan
APOTHECARIES HALL COMPANY 1555
Waterbury, Conn.
ATLANTIC COMPOUND CO. 1479
Waterbury, Conn.

M. E. BAKER COMPANY 1480
Cambridge, Mass.
BAKER BROS. INC. 1570
So. Boston, Mass.
BAKER & ADAMSON DIV., ALLIED CHEMICAL & DYE CORP. 1572
New York, New York
BART-MESSING CORP. & SEL-REX 1561
Belleville, N. J.
BEAM KNODEL COMPANY 1572
New York, New York
BEHR MANNING CORP. 1475
Troy, New York
BELKE MFG. COMPANY 1495
Chicago, Illinois
BETTER FINISHES & COATINGS, INC. 1484
Newark, N. J.

CEILCOTE COMPANY 1571
Cleveland, Ohio
CHASE BUFF COMPANY 1573
New York, New York
THE CHEMICAL CORPORATION 1476
Springfield, Mass.
CHEMSTEEL CONSTRUCTION COMPANY 1571
Pittsburgh, Pa.
CLEVELAND PROCESS CO. 1580
Cleveland, Ohio
F. L. & J. C. CODMAN COMPANY 1557
Rockland, Mass.

DAVIS SUPPLY MFG. CO. 1584
St. Louis, Missouri
DIAMOND ALKALI COMPANY 1487
Cleveland, Ohio
DIXON & RIPPEL, INC. 1573
Kingston, New York
DUGGAN MASKING DEVICES 1570
Detroit, Michigan
DU-LITE CHEMICAL CORPORATION 1485
Middletown, Conn.

ELKHART CONTROLS CO. 1550
Elkhart, Ind.
ENTHONE, INCORPORATED 1459
New Haven, Conn.

FEDERATED METAL DIVISION, AMERICAN SMELTING & REFINING COMPANY 1470
New York, New York
FORMAX MANUFACTURING COMPANY 1512
Detroit, Michigan
PAUL FRANK 1590
New York, New York
FULTON ASPHALT COMPANY 1589
Chicago, Illinois

GENERAL ELECTRIC COMPANY 1508, 1509
Schenectady, N. Y.
FREDERICK GUMM CHEMICAL COMPANY ..... INSIDE FRONT COVER
Kearny, N. J.
HAMMOND MACHINERY BUILDERS, INC. 1510
Kalamazoo, Michigan
HANSON-VAN WINKLE (J. C. MILLER DIV.) 1564, 1565
Matawan, New Jersey
HARRISON & COMPANY 1572
Haverhill, Mass.
THE HARSHAW CHEMICAL COMPANY 1462
Cleveland, Ohio
HAVEG CORPORATION 1563
Newark, Delaware
J. HOLLAND & SONS, INC. 1568
Brooklyn, New York
R. O. HULL & COMPANY 1503
Rocky River, Ohio

ILLINOIS WATER TREATMENT 1566
Rockford, Ill.
INDUSTRIAL FILTER & PUMP MFG. CO. 1468
Chicago, Illinois
IROTOX 1590
New York, N. Y.

JOE-D BUFF COMPANY 1556
Sandwich, Illinois

KOCOUR COMPANY 1578
Chicago, Illinois
KOPPERS COMPANY, INC. 1554
Pittsburg, Pa.
KOSMOS ELECTROFINISHING, INC. 1579
Belleville, New Jersey
JOSEPH B. KUSHNER 1568
Stroudsburg, Pa.

LASALCO, INC. 1553
St. Louis, Missouri
THE LEA MANUFACTURING COMPANY ..... 1491, OUTSIDE BACK COVER
Waterbury, Connecticut
LEA-RONAL, INC. 1492
Jamaica, New York
CHARLES F. LIHOMMEDIEU & SONS 1469
Chicago, Illinois

MACDERMID, INCORPORATED ..... BACK INSIDE COVER
Waterbury, Connecticut
THE McGEAN CHEMICAL COMPANY 1518
Cleveland, Ohio
THE MEAKER COMPANY 1477
Chicago, Illinois
MICHIGAN BUFF COMPANY 1571
Detroit, Michigan
MICHIGAN CHROME & CHEMICAL 1489
Detroit, Michigan
MINNESOTA MINING & MANUFACTURING CO. 1547
St. Paul, Minnesota

NARACO & ASSOCIATED COMPANIES (NAT'L. RACK CO.) 1552
Paterson, N. J.
NORTHWEST CHEMICAL COMPANY 1515
Detroit, Michigan

OAKITE PRODUCTS, INC. 1576
New York, New York

PLATERS RESEARCH CORP. 1575
New York, New York
POWERS REGULATOR COMPANY 1582
Skokie, Illinois
PROMAT DIVISION (POOR & COMPANY) 1478
Waukegan, Illinois
PYROSIL, INC. 1568
Cuyahoga Falls, Ohio

RAYBESTOS-MANHATTAN, INC. AND MANHATTAN RUBBER DIV. 1504
Passaic, New Jersey
RICHARDSON-ALLEN CORP. 1513
Flushing, New York

SABIN METAL CORP. 1579
Brooklyn, New York
SCHAFFNER MANUFACTURING COMPANY 1464, 1465
Pittsburgh, Pa.
SCHORI PROCESS DIVISION 1577
Long Island City, New York
E. E. SEELEY COMPANY, INC. 1575
Bridgeport, Connecticut
SELLERS ENGINEERING COMPANY 1497
Chicago, Illinois
SETHCO MANUFACTURING COMPANY 1585
Brooklyn, New York
THE SEYMOUR MFG. COMPANY 1505
Seymour, Connecticut
FREDERIC B. STEVENS, INC. 1460
Detroit, Michigan
STORTS WELDING COMPANY, INC. 1472
Meriden, Connecticut
STROMBERG-CARLSON 1573
Rochester, N. Y.
GEORGE A. STUTZ MANUFACTURING CO. 1517
Chicago, Illinois
SULPHUR PRODUCTS COMPANY, INC. 1585
Greensburg, Pennsylvania

TAMMS INDUSTRIES, INC. 1583
Chicago, Ill.
THERMAL AMERICAN FUSED QUARTZ COMPANY 1581
Dover, New Jersey
THOMPSON MFG. CO., INC. 1584
Erie, Pa.
TRUE BRITE CHEMICAL PRODUCTS CO. 1467, 1585
Oakville, Conn.

THE UDYLITE CORPORATION 1500, 1501
Detroit, Michigan
UNIT PROCESS ASSEMBLIES, INC. 1572
New York, New York
UNITED BUFF PRODUCTS CORP. 1574
Passaic, New Jersey
UNITED CHROMIUM, INC. 1483, 1507
New York, New York
U. S. STONEWARE 1514
Akron, Ohio

WAGNER BROTHERS 1526, 1527, 1528, 1529
Detroit, Michigan
WALLACE & TIERNAN 1490
Belleville, New Jersey

ZIALITE CORPORATION 1572
Worcester, Massachusetts

AES

RESEARCH

$1.00? $100? $40,000?

WHAT FOR?? WHY?? WHAT'S IT ALL ABOUT??

Dear Fellow AES Member:
These questions are good ones, and you're entitled to ask them, particularly now that *you* and every other member *are investing* in our vital Research Program. Briefly, here are the basic answers:

$1—is each **regular member's annual payment** with the new per capita tax increase. This will provide the fund with over $6,000 each year. While the money is needed to help support an active, expanding program, it is perhaps equally important in bringing you into the picture personally, to develop your interest and prompt you to **learn more about the program,** thereby obtaining your **full support** of it.

$100—is the annual cost of a **Sustaining Membership.** We currently have over 350 of them, held by about 300 firms. More are needed. All job shops and manufacturers should be vitally interested in strengthening and building the Electroplating Industry.

$40,000—is the approximate annual budget for the program. Realize that because AES Research is being carried out with much time devoted by members and member firms, and with most work done in college and university labs, that equivalent effort in industry would be up to *five times as costly!*

WATCH— this page for information on AES Research.

GIVE—the Research Program the attention it deserves.

GET—all that you can from it through current and past reports.

ASSIST—your branch Research Chairman in his efforts to obtain additional Sustaining Memberships.

• • •

INVEST NOW!!!

"YOUR BEST BET'S THE AES RESEARCH PROGRAM"

ORIGINAL

"pH PAPERS"

Accurate ph values in a few seconds right at the tank.

These are the original "pH Papers" invented and produced by an outstanding German chemist. Guard against imitations using similar designations.

Indicator AND control-colors on SAME strip. Control-colors in steps of 0.2 pH and 0.3 pH.

Plating ranges
(200 strips of a range per box)

Acid:	Alkaline:
*4.8–6.2 pH	6.6– 8.0 pH
*3.6–5.0 pH	7.3– 8.7 pH
*2.4–3.9 pH	8.6–10.0 pH
1.0–2.8 pH	10.1–11.3 pH
0.4–1.4 pH	11.0–13.1 pH

*Electrometric Values in Nickel Solutions.

Each range is boxed separately.

PAUL FRANK

118 East 28th Street NEW YORK 16

Tel. MU 9-5286

USE READER SERVICE CARD; INDICATE A 1297.

Prompt Delivery

NICKEL ANODES

NICKEL SULFATE NICKEL CARBONATE
NICKEL CHLORIDE COPPER CYANIDE
All Plating Chemicals

IRITOX

CHEMICAL COMPANY

5 Union Square West, New York 3, N. Y.

WAtkins 4-1977

FUTURE MEETINGS

INTERSOCIETY

December 10-16—American Institute of Chemical Engineers, Public Auditorium, Cleveland, Ohio.

December 12-16—Engineers Joint Council, coordinating Nuclear Engineering and Science Congress for 26 engineering and scientific groups. Public Auditorium, Cleveland, Ohio.

January 9-10—2nd National Symposium on Reliability and Quality Control in Electronics, Hotel Statler, Washington, D. C.

January 9-13—Society of Automotive Engineers, Inc. Annual meeting, the Sheraton-Cadillac and Statler Hotels, Detroit, Mich.

January 19-20—Society of Plastics Engineers. 12th Annual Conference, Statler Hotel, Cleveland, Ohio.

January 23-26—Plant Maintenance & Engineering Conference and Show, Convention Hall, Philadelphia, Pa.

January 30-February 3—American Institute of Electrical Engineers (AIEE), Hotel Statler, New York, N. Y.

February 26-29—American Institute of Chemical Engineers, Los Angeles, Calif.

February 27-March 2—ASTM Committee Week, Hotel Statler, Buffalo, N. Y.

AES

December 2—Annual Meeting, Detroit Branch, AES, Hotel Statler, Detroit, Mich.

December 2—AES Research Committee Meeting, Hotel Statler, Detroit, Mich.

December 16-17—Newark Branch, AES, Hotel Robert Treat, Newark, N. J.—Educational session Friday evening December 16; Christmas party Saturday evening December 17.

January 27—Editorial Board Meeting, Conrad Hilton Hotel, Chicago, Ill.

February 10-11—Annual Meeting, Educational Session and Banquet, Southeastern Branch, AES, Biltmore Hotel, Atlanta, Ga.

March 10—Third Annual Tri-State Regional Meeting, AES, Hotel Biltmore, Dayton, Ohio.

April 7—New England Regional Meeting, AES, Hotel Statler, Hartford, Conn.

April 14—2nd Annual Empire State Regional Meeting, AES, Hotel Statler, Buffalo, N. Y.

May 5—Annual Regional Meeting, Toronto Branch, AES, Sheraton-Brock Hotel, Niagara Falls, Ontario, Canada.

June 17-21, 1956—43rd Annual Convention of the American Electroplaters' Society, Hotel Statler, Washington, D. C.

June 17-20, 1957—44th Annual Convention of the American Electroplaters' Society, Sheridan-Mt. Royal Hotel, Montreal, Canada.

May 19-22, 1958—45th Annual Convention of the American Electroplaters' Society, Sheraton-Gibson Hotel, Cincinnati, Ohio.

We hope this Christmas scene of Bethlehem, Connecticut will remind you of many happy Christmases of yesteryear . . . May the spirit and hope of the first Bethlehem be with you at this Holiday Season and in the years to come.

MACDERMID INCORPORATED

THE INDUSTRY'S BEST KNOWN TRADEMARK!

LEA

Compound

Liquabrade

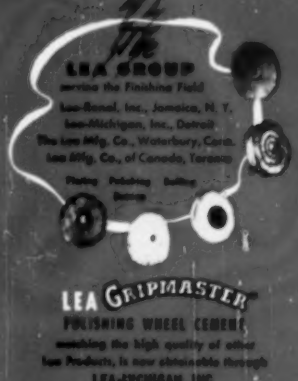
at

ONEIDA LTD.

SILVER . . . the sign of gracious living and fine tradition.

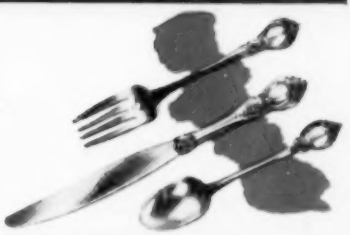
FINISHING . . . the engineering key to fine products with a consumer appeal.

LEA . . . Oneida Ltd.'s source and your source for finishing methods and compositions which lower your manufacturing costs and improve the finish of your product.



HEIRLOOM* STERLING

Oneida Ltd.'s highest quality merchandise. Lea Compound is used to bring out the fine patine prior to wrapping for ultimate delivery.



COMMUNITY* PLATE HOLLOWARE

High quality merchandise cannot be offered at attractive prices without the use of automatic finishing methods. Here a small rotary automatic buffing machine buffs round trays prior to the plating operation. A perfect finish must be achieved and the liquid buffing compound is Lea Liquabrade.

We'd like to work with you on your finishing problems . . .

Burring, Buffing, Polishing, Lapping, Plating and Spray Finishing . . . Manufacturers and Specialists in the Development of Production Methods, Equipment and Compositions.

Manufacturers of Lea Compound and Learok . . . Industry's quality buffing and polishing compounds for over 30 years.

LEA ®

THE LEA MANUFACTURING CO.

16 CHERRY AVE., WATERBURY 20, CONN.

Lea-Michigan, Inc., 14066 Stansbury Ave., Detroit 27, Mich.
Lea Mfg. Company of Canada, Ltd., 370 Victoria St., Toronto 2, Canada
Lea-Ronal, Inc., Main Office and Laboratory: 139-20 109th Ave., Jamaica 35, N. Y.
Manufacturing Plant: 237 East Aurora St., Waterbury 20, Conn.

FOR FURTHER INFORMATION, USE READER SERVICE CARD; INDICATE ■ 1202.